Technical Specifications

Agilent Technologies
PNA Series Network Analyzers
N5230A/C
Options 020/025, 120/125, 220/225, 420/425, and 520/525
(2-Port PNA-L)

Manufacturing Part Number: N5230-90016

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Technical Specifications for the N5230A/C N5230-90016, Rev. 2010-11-09

Options 020/025, 120/125, 220/225, 420/425, or 520/525 (2-Port PNA-L)

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Definitions

All specifications and characteristics apply over a 25 °C ±5 °C range (unless otherwise stated) and 90 minutes after the instrument has been turned on.

Specification (spec.): Warranted performance. Specifications include guardbands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

Characteristic (char.): A performance parameter that the product is expected to meet before it leaves the factory, but that is not verified in the field and is not covered by the product warranty. A characteristic includes the same guardbands as a specification.

Typical (typ.): Expected performance of an average unit which does not include guardbands. It is not covered by the product warranty.

Nominal (nom.): A general, descriptive term that does not imply a level of performance. It is not covered by the product warranty.

Calibration: The process of measuring known standards to characterize a network analyzer's systematic (repeatable) errors.

Corrected (residual): Indicates performance after error correction (calibration). It is determined by the quality of calibration standards and how well "known" they are, plus system repeatability, stability, and noise.

Uncorrected (raw): Indicates instrument performance without error correction. The uncorrected performance affects the stability of a calibration.

Standard: When referring to the analyzer, this includes no options unless noted otherwise.

Corrected System Performance

The specifications in this section apply for measurements made with the N5230A/C analyzer with the following conditions:

- 10 Hz IF bandwidth
- No averaging applied to data
- Isolation calibration with an averaging factor of 8

Table 1. System Dynamic Range[1]

Description	Specification (dB) at Test Port				Typical (dB) at Test Port			
	Options 020, 120	Option 220	Option 420	Option 520	Options 020, 120	Option 220	Option 420	Option 520
Standard Configuration and Standard Power Range								
300 kHz to 3 MHz[2]	93[3]	--	--	--	--	--	--	--
1 MHz to 10 MHz	113	--	--	--	--	--	--	--
10 MHz to 45 MHz	122	--	--	--	--	103	89	89
45 MHz to 70 MHz[4]	122	101	90	90	--	--	--	--
70 MHz to 500 MHz[4]	122	105	90	90	--	--	--	--
500 MHz to 2 GHz	122	110	110	110	--	--	--	--
2 GHz to 6 GHz	122	110	110	110	--	--	--	--
6 GHz to 8 GHz	120	110	110	110	--	--	--	--
8 GHz to 9 GHz	120	110	100	100	--	--	--	--
9 GHz to 10.5 GHz	116	110	100	100	--	--	--	--
10.5 GHz to 12.5 GHz	111	110	100	100	--	--	--	--
12.5 GHz to 13.5 GHz	109	108	100	100	--	--	--	--
13.5 GHz to 20 GHz	--	108	100	100	--	--	--	--
20 GHz to 31.25 GHz	--	--	95	95	--	--	--	--
31.25 GHz to 40 GHz	--	--	90	90	--	--	--	--
40 GHz to 50 GHz	--	--	--	79	--	--	--	--

Table 1. System Dynamic Range[1] (Continued)

Description	Specification (dB) at Test Port				Typical (dB) at Test Port			
	Options 025, 125	Option 225	Option 425	Option 525	Options 025, 125	Option 225	Option 425	Option 525
Configurable Test Set and Extended Power Range								
300 kHz to 3 MHz[2]	92[3]	--	--	--	--	--	--	--
3 MHz to 10 MHz	112	--	--	--	--	--	--	--
10 MHz to 45 MHz	121	--	--	--	--	103	88	88
45 MHz to 70 MHz[4]	121	101	90	90	--	--	--	--
70 MHz to 500 MHz[4]	121	105	90	90	--	--	--	--
500 MHz to 2 GHz	121	110	110	110	--	--	--	--
2 GHz to 6 GHz	121	110	110	110	--	--	--	--
6 GHz to 8 GHz	120	110	110	110	--	--	--	--
8 GHz to 9 GHz	120	110	100	100	--	--	--	--
9 GHz to 10.5 GHz	116	110	100	100	--			
10.5 GHz to 12.5 GHz	111	110	100	100	--	--	--	--
12.5 GHz to 13.5 GHz	108	108	100	100	--	--	--	--
13.5 GHz to 20 GHz	--	108	100	100	--	--	--	--
20 GHz to 31.25 GHz	--	--	92	92	--	--	--	--
31.25 GHz to 40 GHz	--	--	87	87	--	--	--	--
40 GHz to 50 GHz	--	--	--	75	--	--	--	--

[1] The system dynamic range is calculated as the difference between the noise floor and the specified source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account.

[2] May be limited by crosstalk at certain frequencies below 3 MHz.

[3] Value and frequency band changed July 2006.

[4] May be degraded typically by 10 dB at particular frequencies (multiples of 5 MHz) below 500 MHz due to spurious receiver residuals. Methods are available to regain the full dynamic range.

Receiver Dynamic Range technical specifications are not provided in this N5230A/C specs document.

Table 2. Extended Dynamic Range[1]

Description	Specification (dB) at Direct Receiver Access Input				Typical (dB) at Direct Receiver Access Input			
	Option 025, 125	Option 225	Option 425	Option 525	Option 025, 125	Option 225	Option 425	Option 525
Configurable Test Set and Extended Power Range								
300 kHz to 3 MHz[2]	108[3]	--	--	--	--	--	--	--
3 MHz to 10 MHz	128	--	--	--	--	--	--	--
10 MHz to 45 MHz	137	--	--	--	--	115	109	109
45 MHz to 70 MHz[4]	137	113	111	111	--	--	--	--
70 MHz to 500 MHz[4]	137	117	111	111	--	--	--	--
500 MHz to 2 GHz	137	122	122	122	--	--	--	--
2 GHz to 6 GHz	137	--	--	--	--	--	--	--
6 GHz to 8 GHz	136	122	122	122	--	--	--	--
8 GHz to 9 GHz	136	--	--	--	--	--	--	--
9 GHz to 10.5 GHz	132	122	112	112	--	--	--	--
10.5 GHz to 12.5 GHz	127	122	112	112	--	--	--	--
12.5 GHz to 13.5 GHz	124	120	112	112	--	--	--	--
13.5 GHz to 20 GHz	--	120	112	112	--	--	--	--
20 GHz to 31.25 GHz	--	--	103	103	--	--	--	--
31.25 GHz to 40 GHz	--	--	98	98	--	--	--	--
40 GHz to 50 GHz	--	--	--	83	--	--	--	--

[1] The direct receiver access input extended dynamic range is calculated as the difference between the direct receiver access input noise floor and the source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account. This set-up should only be used when the receiver input will never exceed its compression or damage level. When the analyzer is in segment sweep mode, it can have predefined frequency segments which will output a higher power level when the extended dynamic range is required (i.e. devices with high insertion loss), and reduced power when receiver compression or damage may occur (i.e. devices with low insertion loss). The extended range is only available in one-path transmission measurements.

[2] May be limited by crosstalk at certain frequencies below 3 MHz.

[3] Value and frequency band changed July 2006.

[4] May be degraded typically by 10 dB at particular frequencies (multiples of 5 MHz) below 500 MHz due to spurious receiver residuals. Methods are available to regain the full dynamic range.

N5230A/C Corrected System Performance with 3.5mm Connectors

Options 220/225, 420/425, 520/525: From 10 MHz to 45 MHz, performance is characterized as "typical". To generate these typical values, please download our free Uncertainty Calculator from http://www.agilent.com/find/na_calculator.

85052B Calibration Kit

Table 3. 85052B Calibration Kit
N5230A/C- Option 020/120 (Standard Test Set and Standard Power Range)

Applies to the N5230A/C Option 020/120 analyzers, 85052B (3.5mm) calibration kit, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

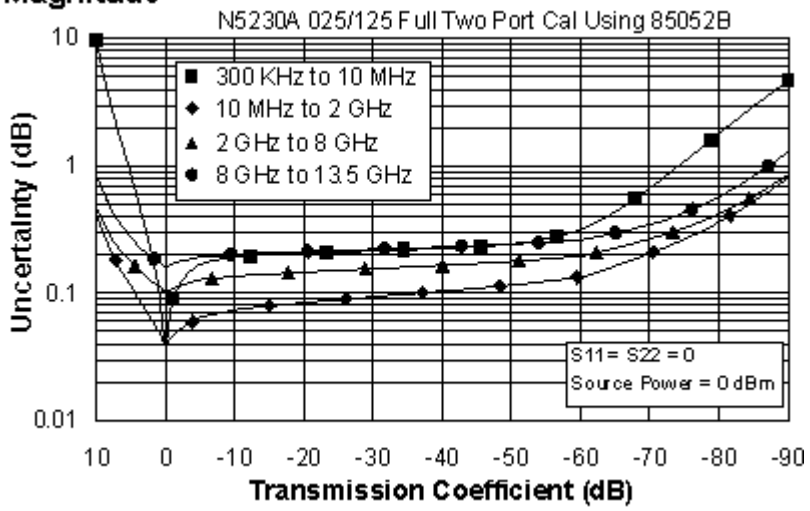
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	300 kHz to 10 MHz	**10 MHz to 2 GHz**	**2 GHz to 8 GHz**	**8 to 13.5 GHz**
Directivity	48	48	44	44
Source Match	40	40	33	31
Load Match	48	48	44	44
Reflection Tracking	±0.003 +0.02/°C	±0.003 +0.02/°C	±0.003 +0.03/°C	±0.006 +0.03/°C
Transmission Tracking	±0.017 +0.02/°C	±0.015 +0.02/°C	±0.075 +0.03/°C	±0.131 +0.03/°C

NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude



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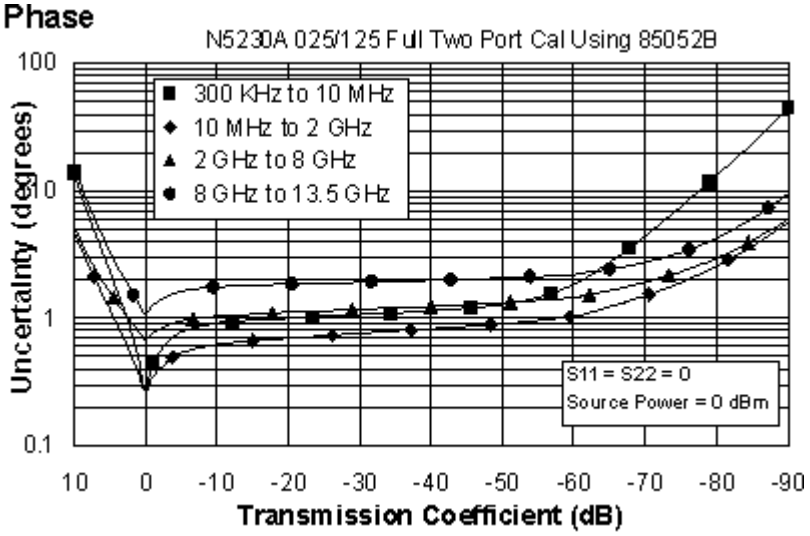
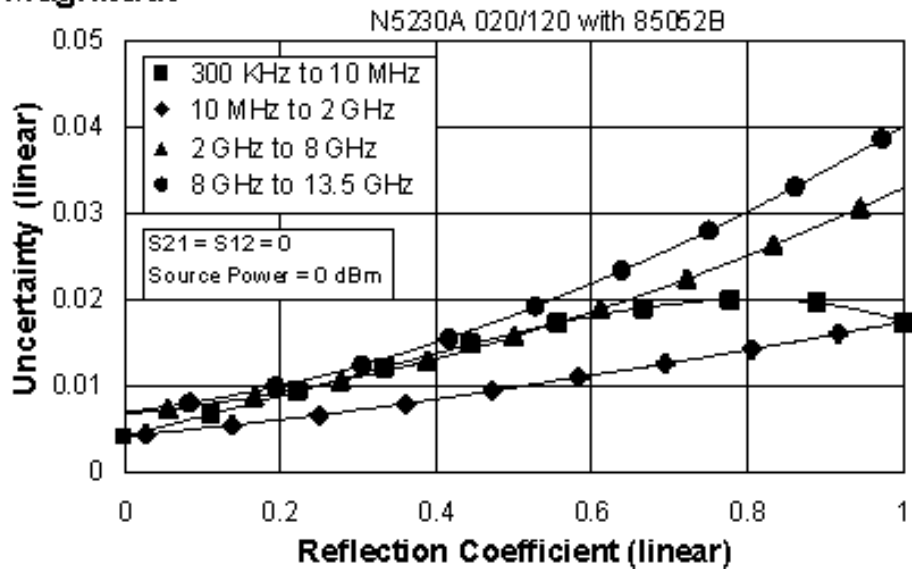


Reflection Uncertainty (Specifications)

Magnitude



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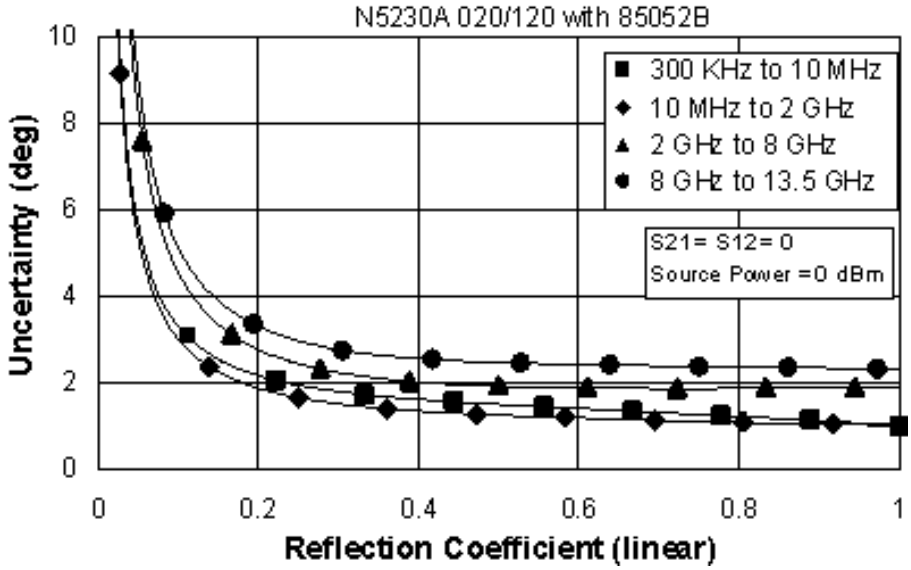


Table 4. 85052B Calibration Kit
N5230A/C- Option 025/125 (Configurable Test Set and Extended Power Range)

Applies to the N5230A/C Option 025/125 analyzers, 85052B (3.5mm) calibration kit, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

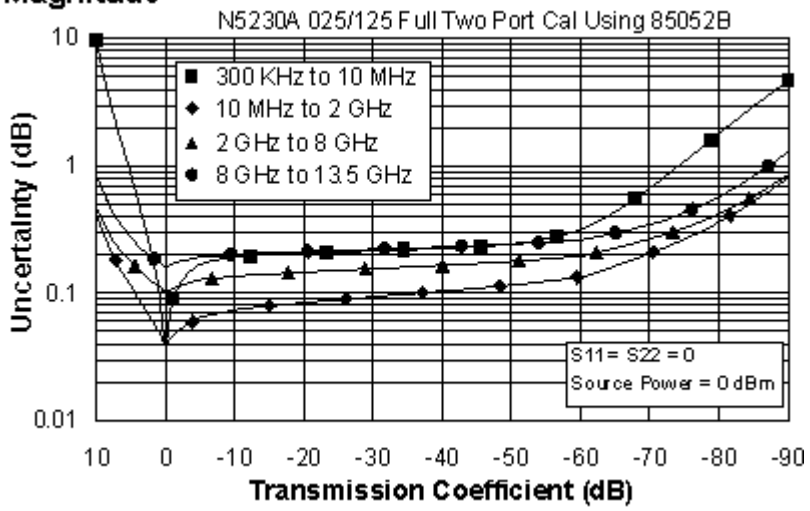
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	300 kHz to 10 MHz	**10 MHz to 2 GHz**	**2 GHz to 8 GHz**	**8 to 13.5 GHz**
Directivity	48	48	44	44
Source Match	40	40	33	31
Load Match	48	48	44	44
Reflection Tracking	±0.003 +0.02/°C	±0.003 +0.02/°C	±0.003 +0.03/°C	±0.006 +0.03/°C
Transmission Tracking	±0.017 +0.02/°C	±0.015 +0.02/°C	±0.075 +0.03/°C	±0.131 +0.03/°C

NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude



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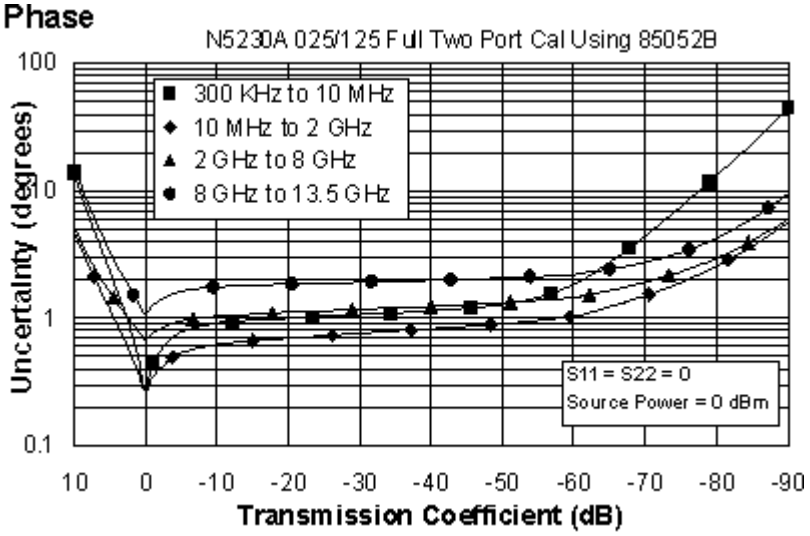
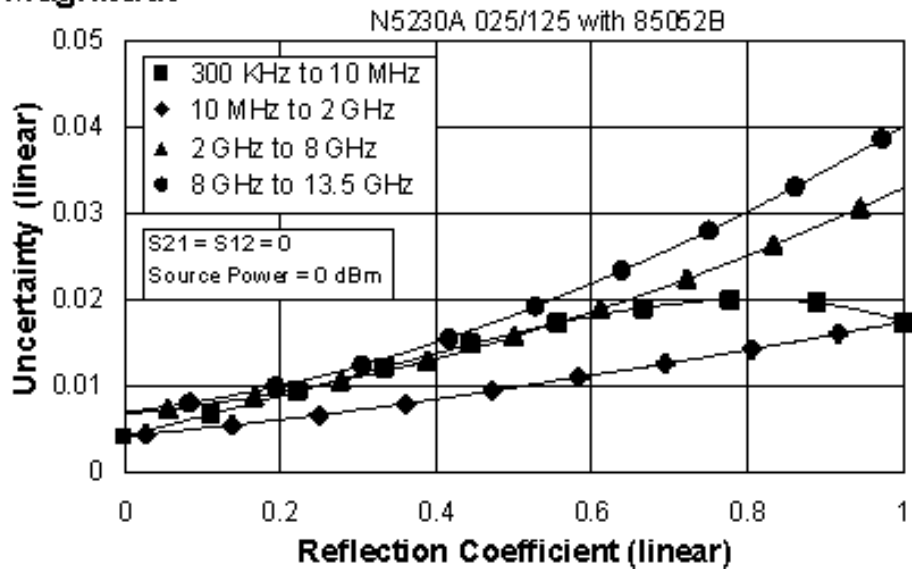


Reflection Uncertainty (Specifications)

Magnitude



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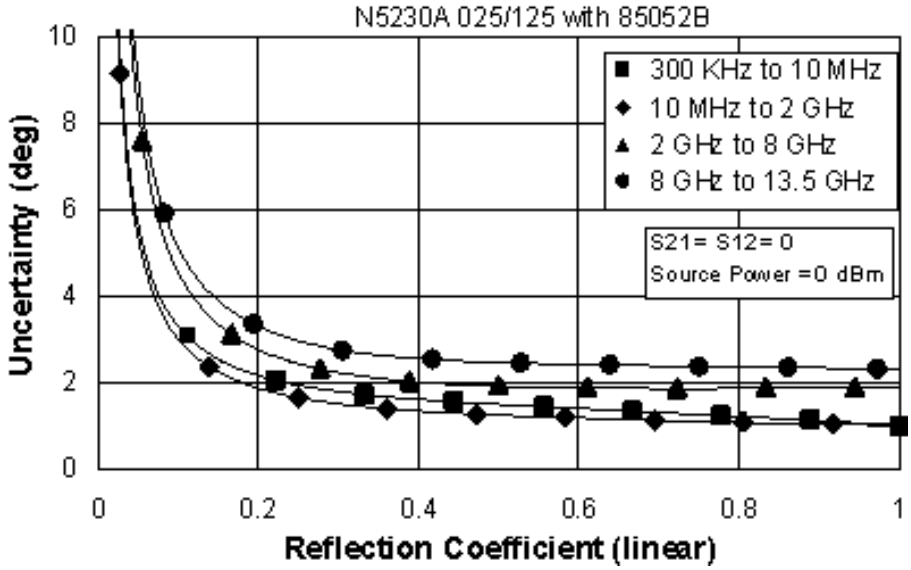


Table 5. 85052B Calibration Kit
N5230A/C- Option 220 (Standard Test Set and Standard Power Range)

Applies to the, N5230A/C Option 220 analyzers, 85052B (3.5mm) calibration kit, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

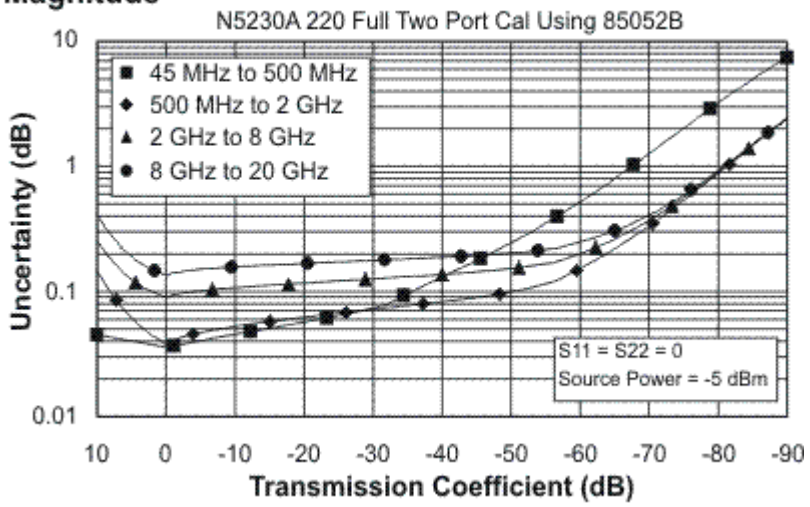
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	45 MHz to 500 MHz	**500 MHz to 2 GHz**	**2 to 8 GHz**	**8 to 20 GHz**
Directivity	48	48	44	44
Source Match	40	40	33	31
Load Match	48	48	44	44
Reflection Tracking	±0.003 +0.02/°C	±0.003 +0.02/°C	±0.003 +0.03/°C	±0.006 +0.03/°C
Transmission Tracking	±0.010 +0.02/°C	±0.014 +0.02/°C	±0.062 +0.03/°C	±0.104 +0.03/°C

NOTE: The following graphs also apply to the “C” model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude



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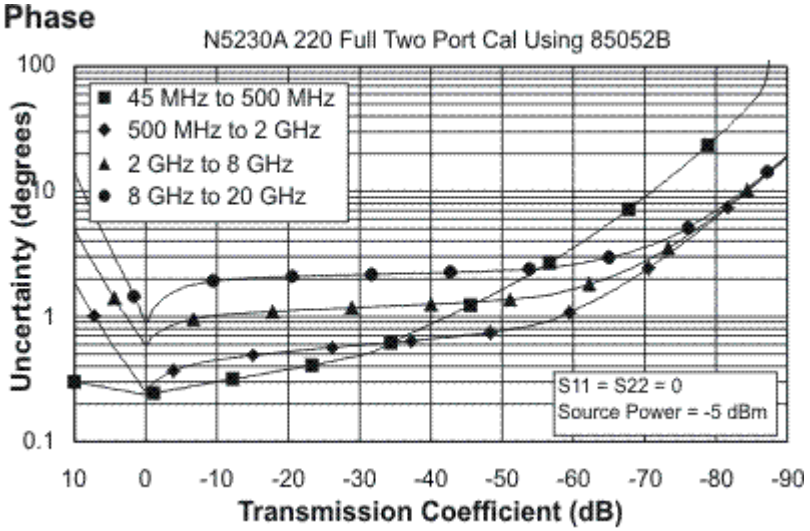
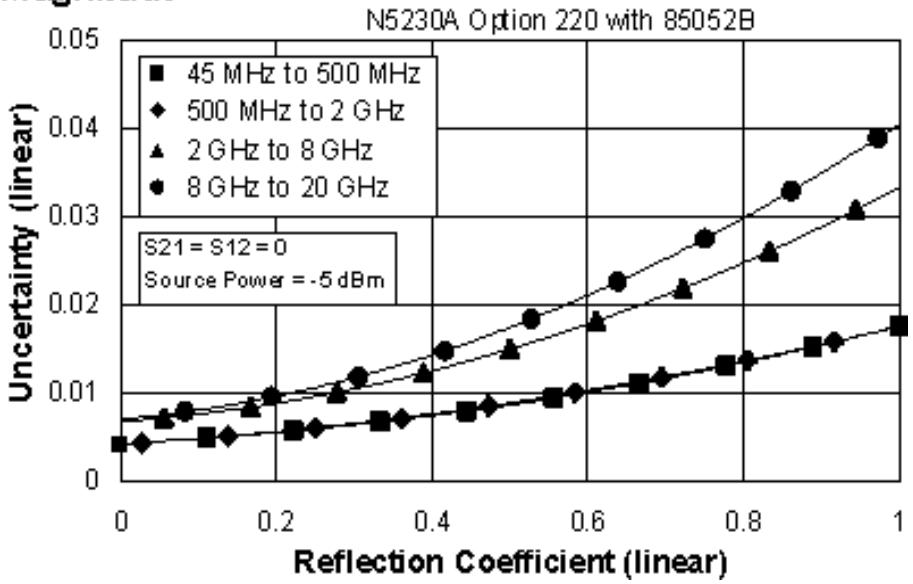


Reflection Uncertainty (Specifications)

Magnitude



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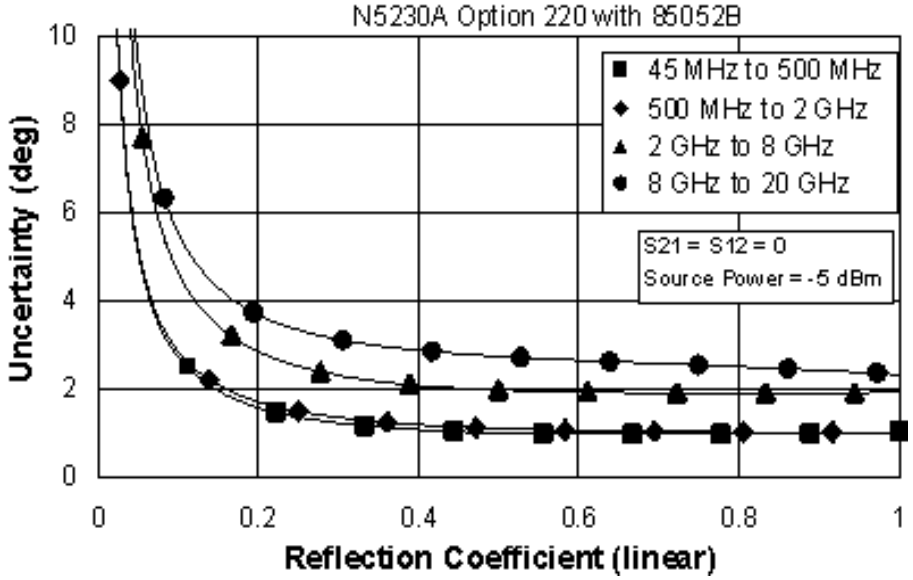


Table 6. 85052B Calibration Kit
N5230A/C- Option 225 (Configurable Test Set and Extended Power Range)

Applies to the, N5230A/C Option225 analyzers, 85052B (3.5mm) calibration kit, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

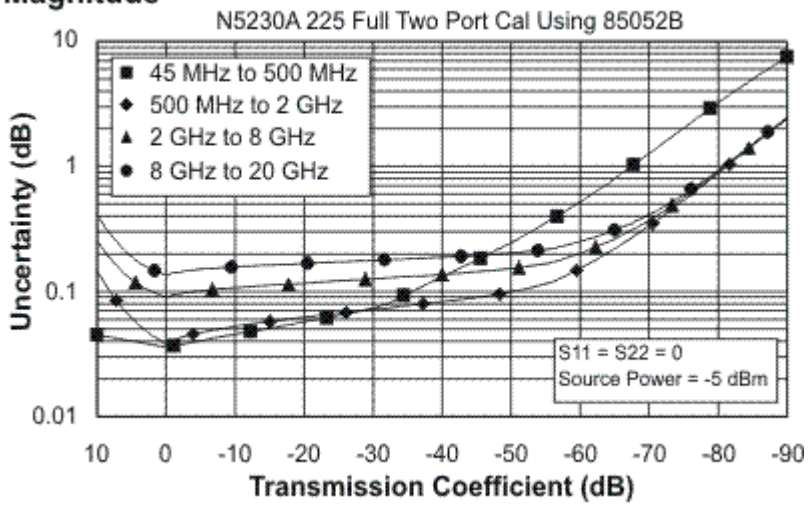
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	45 MHz to 500 MHz	**500 MHz to 2 GHz**	**2 to 8 GHz**	**8 to 20 GHz**
Directivity	48	48	44	44
Source Match	40	40	33	31
Load Match	48	48	44	44
Reflection Tracking	±0.003 +0.02/°C	±0.003 +0.02/°C	±0.003 +0.03/°C	±0.006 +0.03/°C
Transmission Tracking	±0.010 +0.02/°C	±0.014 +0.02/°C	±0.062 +0.03/°C	±0.104 +0.03/°C

NOTE: The following graphs also apply to the “C” model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude



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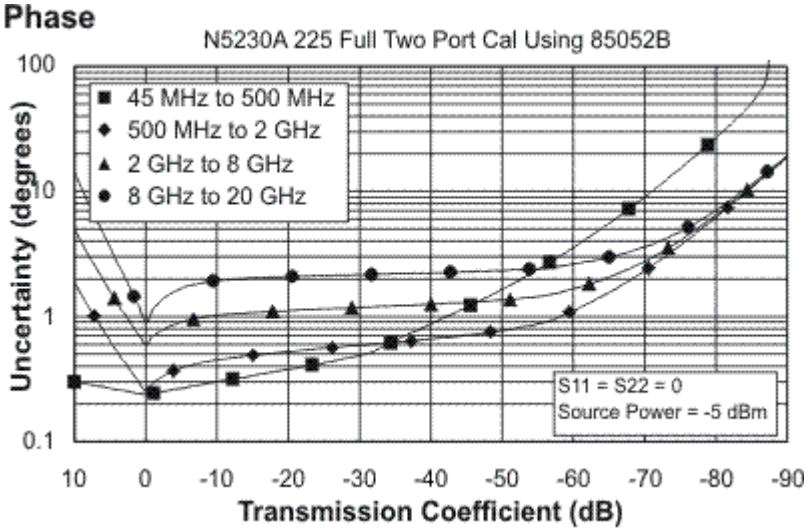
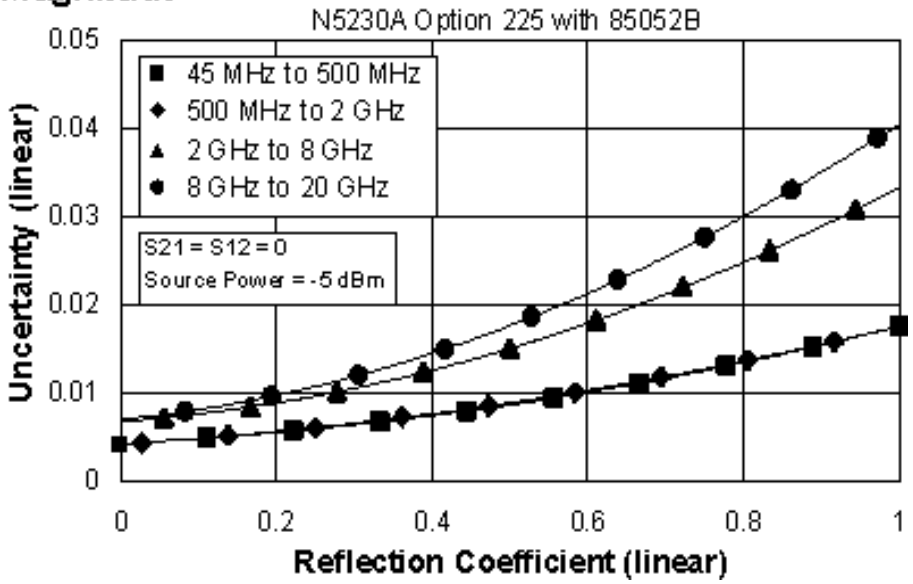


Reflection Uncertainty (Specifications)

Magnitude



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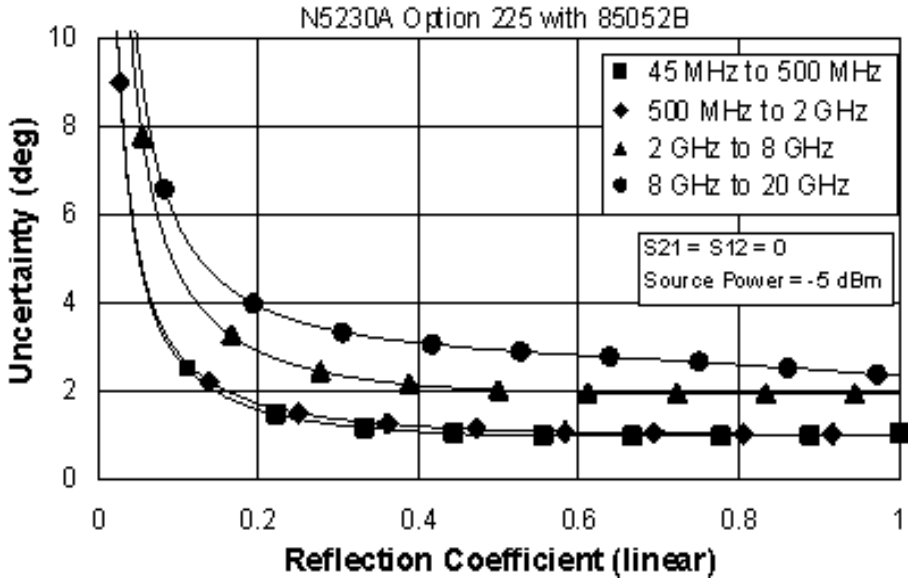


Table 7. N4691B Electronic Calibration Module N5230A/C- Option 220 (Standard Test Set and Standard Power Range)

Applies to the, N5230A/C Option220 analyzers, N4691B (3.5mm) electronic calibration module, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

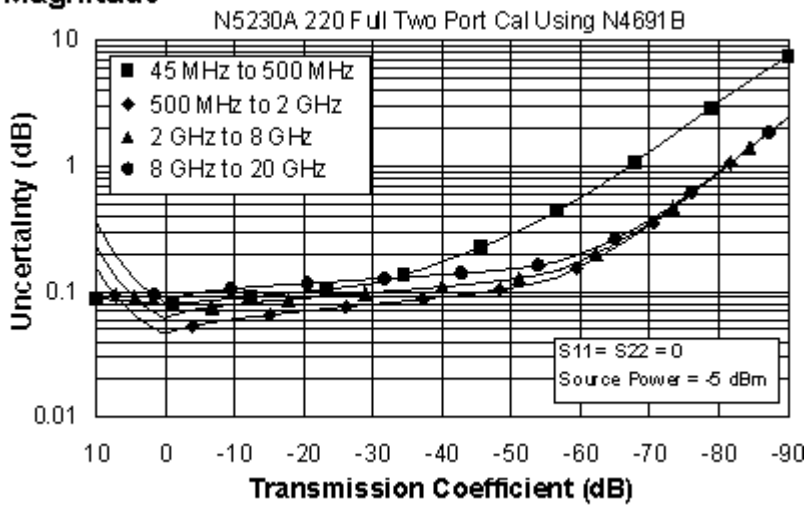
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	45 MHz to 500 MHz	**500 MHz to 2 GHz**	**2 to 8 GHz**	**8 to 20 GHz**
Directivity	46	56	54	48
Source Match	41	47	45	44
Load Match	41	47	44	42
Reflection Tracking	±0.050 +0.02/°C	±0.020 +0.02/°C	±0.030 +0.03/°C	±0.040 +0.03/°C
Transmission Tracking	±0.053 +0.02/°C	±0.021 +0.02/°C	±0.034 +0.03/°C	±0.052 +0.03/°C

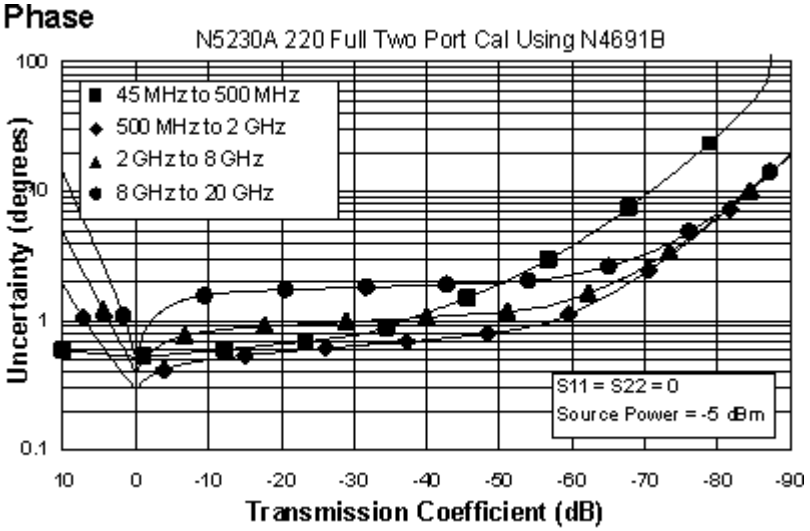
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude

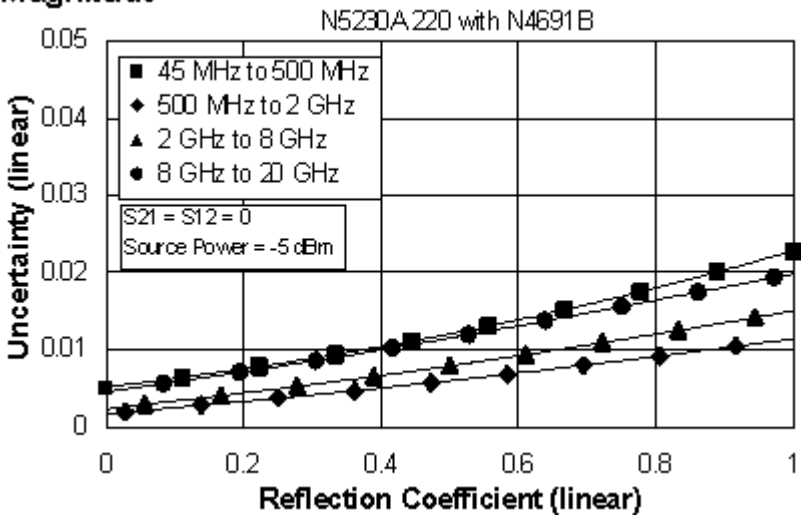


Phase



Reflection Uncertainty (Specifications)

Magnitude



Phase

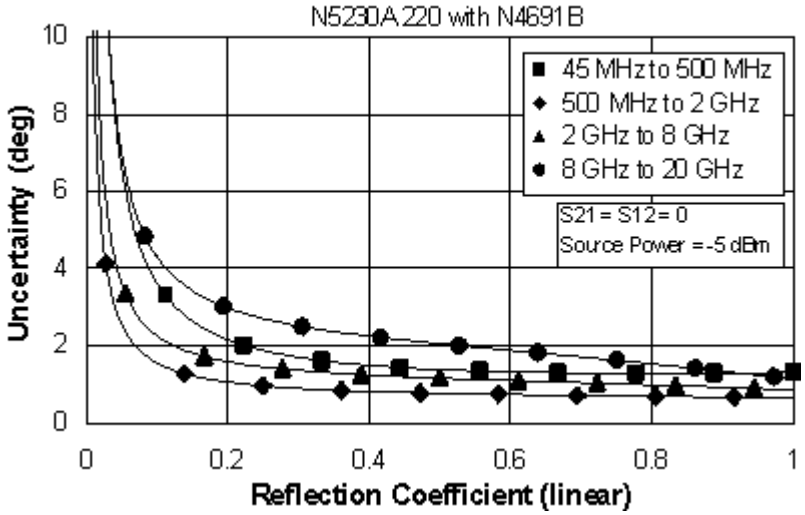


Table 8. N4691B Electronic Calibration Module N5230A/C- Option 225 (Configurable Test Set and Extended Power Range)

Applies to the, N5230A/C Option225 analyzers, N4691B Electronic Calibration Module, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

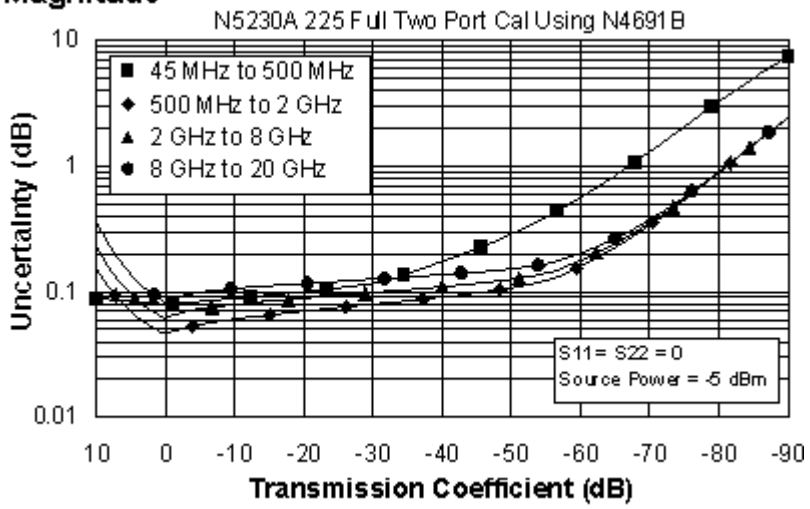
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	45 MHz to 500 MHz	**500 MHz to 2 GHz**	**2 to 8 GHz**	**8 to 20 GHz**
Directivity	46	56	54	48
Source Match	41	47	45	44
Load Match	41	47	44	42
Reflection Tracking	±0.050 +0.02/°C	±0.020 +0.02/°C	±0.030 +0.03/°C	±0.040 +0.03/°C
Transmission Tracking	±0.053 +0.02/°C	±0.021 +0.02/°C	±0.034 +0.03/°C	±0.052 +0.03/°C

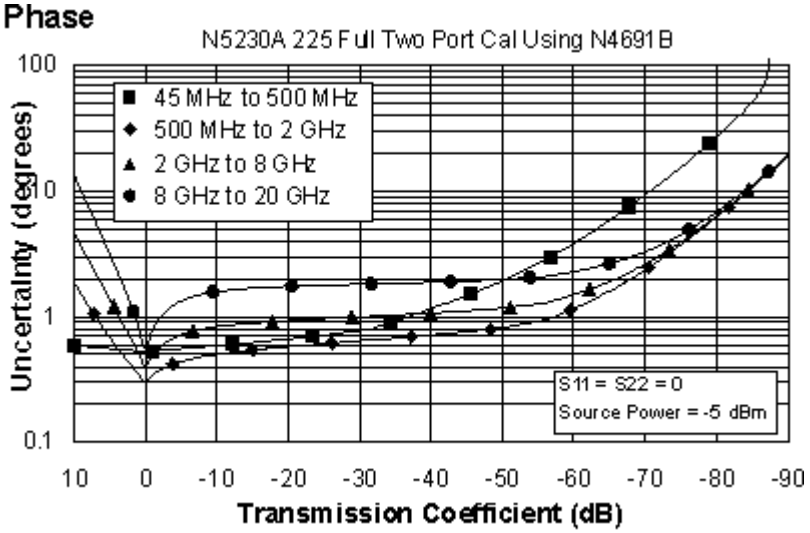
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude

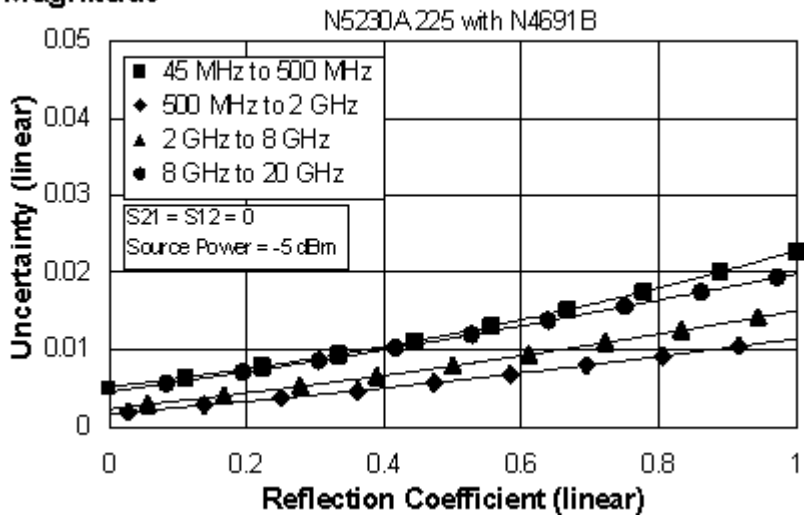


Phase

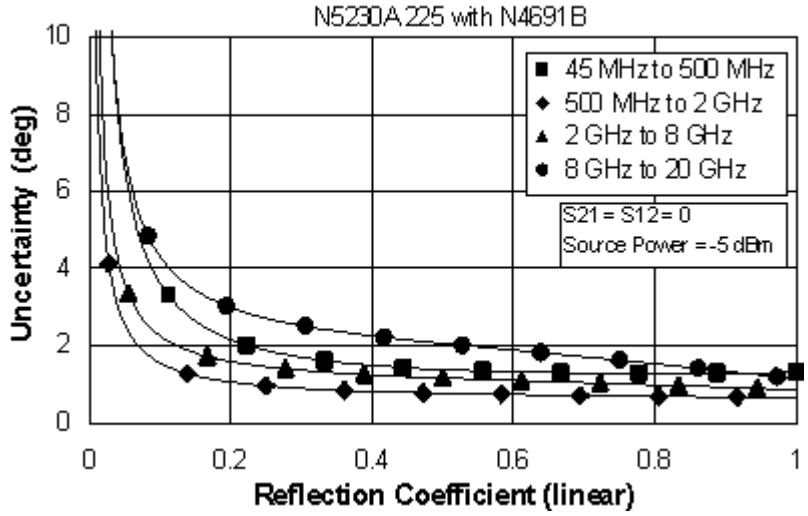


Reflection Uncertainty (Specifications)

Magnitude



Phase



N5230A/C Corrected System Performance with 2.4mm Connectors

85056A Calibration Kit:

Table 9. 85056A Calibration Kit
N5230A/C- Option 420 or 520 (Standard Test Set and Standard Power Range)

Applies to the N5230A/C Option420 or 520 analyzers, 85056A (2.4mm) Electronic Calibration Module, 85133F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

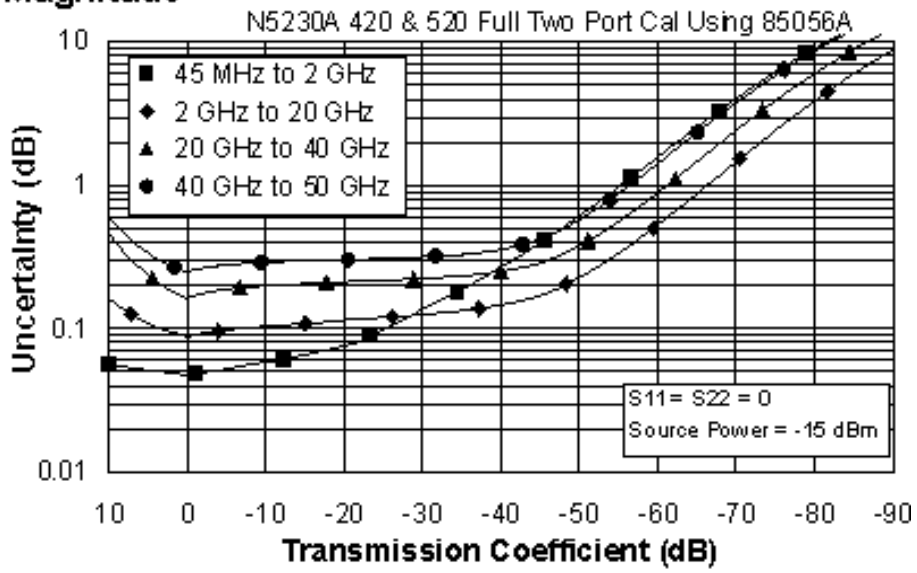
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	45 MHz to 2 GHz	**2 to 20 GHz**	**20 to 40 GHz**	**40 to 50 GHz**
Directivity	42	42	38	36
Source Match	41	38	33	31
Load Match	42	42	37	35
Reflection Tracking	±0.001 +0.02/°C	±0.008 +0.02/°C	±0.020 +0.02/°C	±0.027 +0.03/°C
Transmission Tracking	±0.019 +0.02/°C	±0.060 +0.02/°C	±0.129 +0.02/°C	±0.211 +0.03/°C

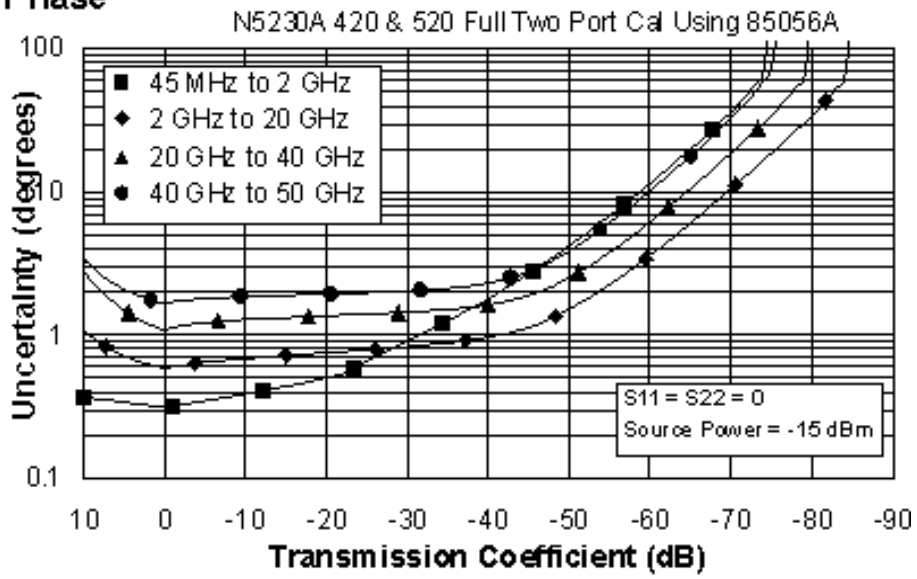
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude

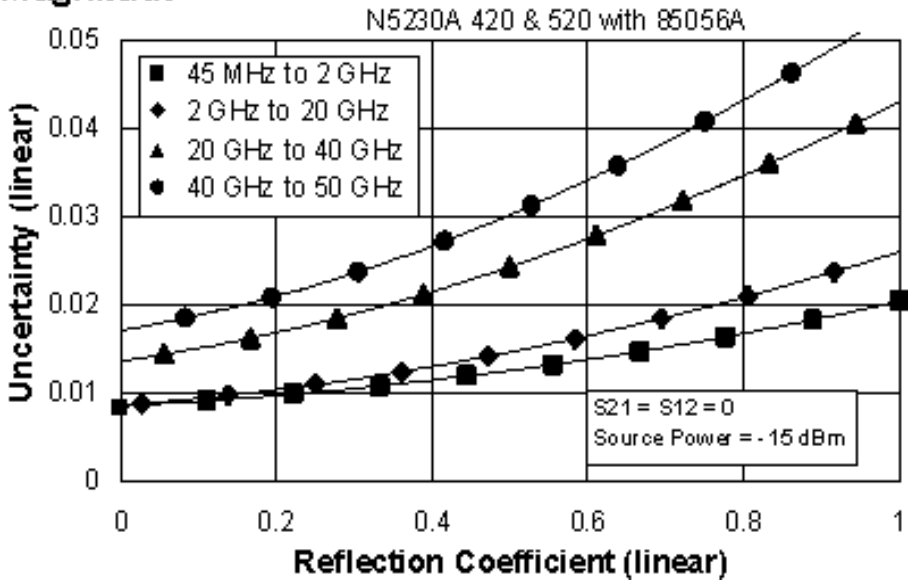


Phase



Reflection Uncertainty (Specifications)

Magnitude



Phase

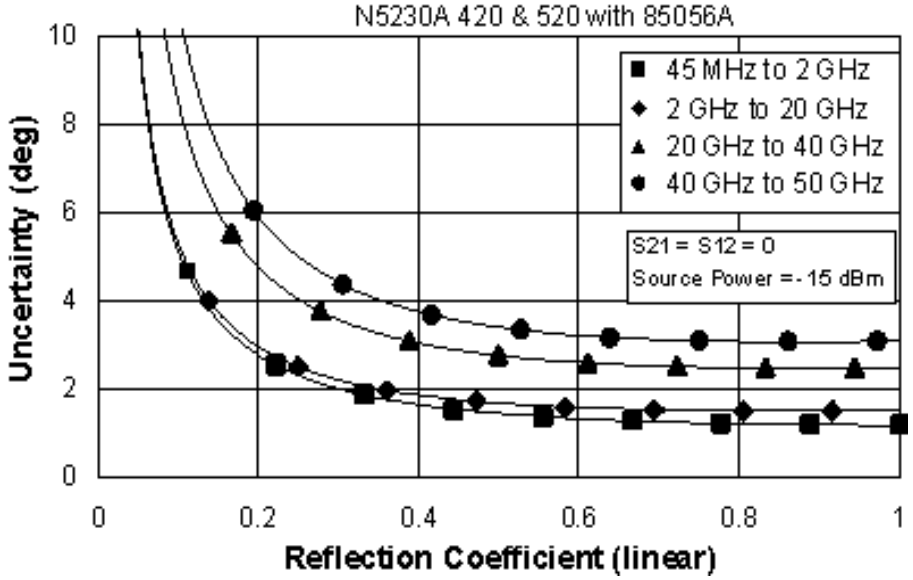


Table 10. 85056A Calibration Kit
N5230A/C- Option 425 or 525 (Configurable Test Set and Extended Power Range)

Applies to the N5230A/C Option425 or 525 analyzers, 85056A (2.4mm) Electronic Calibration Module, 85133F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

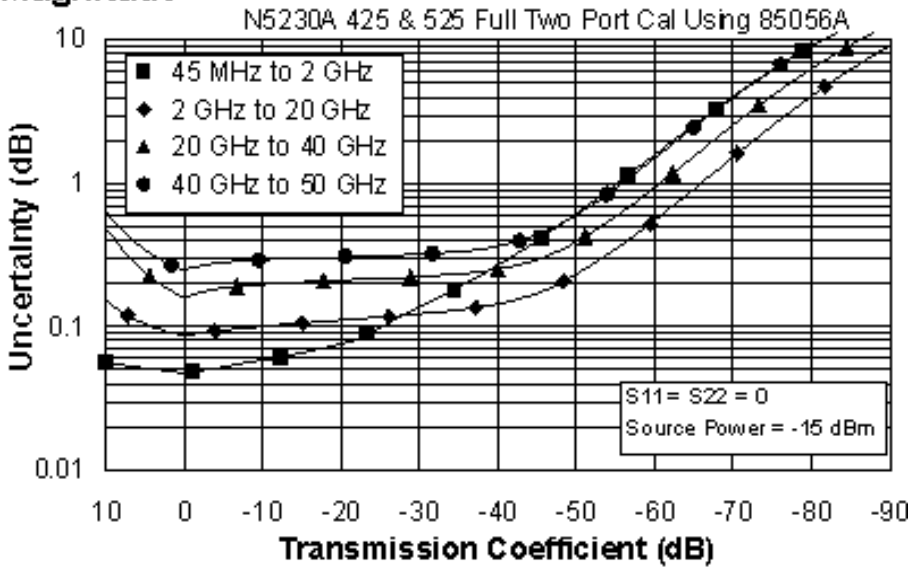
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	45 MHz to 2 GHz	**2 to 20 GHz**	**20 to 40 GHz**	**40 to 50 GHz**
Directivity	42	42	38	36
Source Match	41	38	33	31
Load Match	42	42	37	35
Reflection Tracking	±0.001 +0.02/°C	±0.008 +0.02/°C	±0.020 +0.02/°C	±0.027 +0.03/°C
Transmission Tracking	±0.019 +0.02/°C	±0.057 +0.02/°C	±0.124 +0.02/°C	±0.211 +0.03/°C

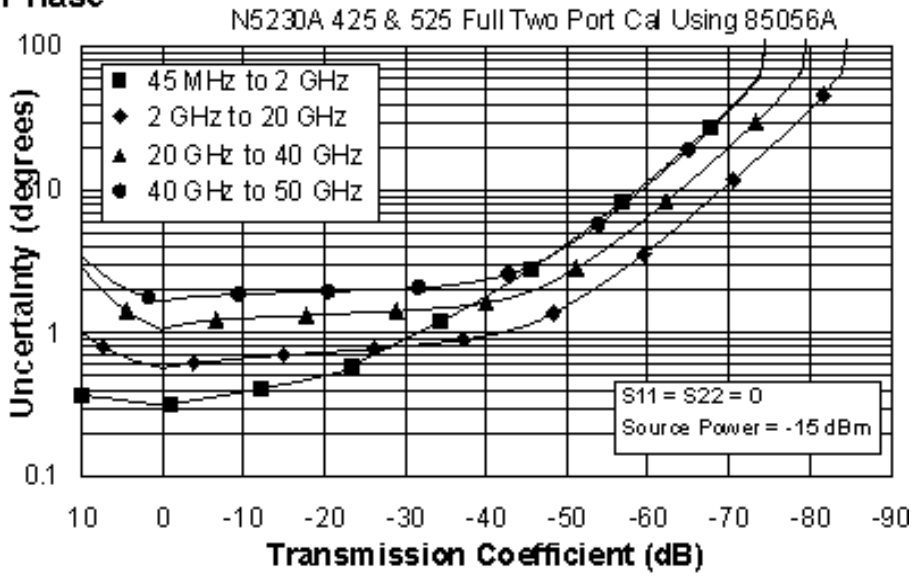
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude

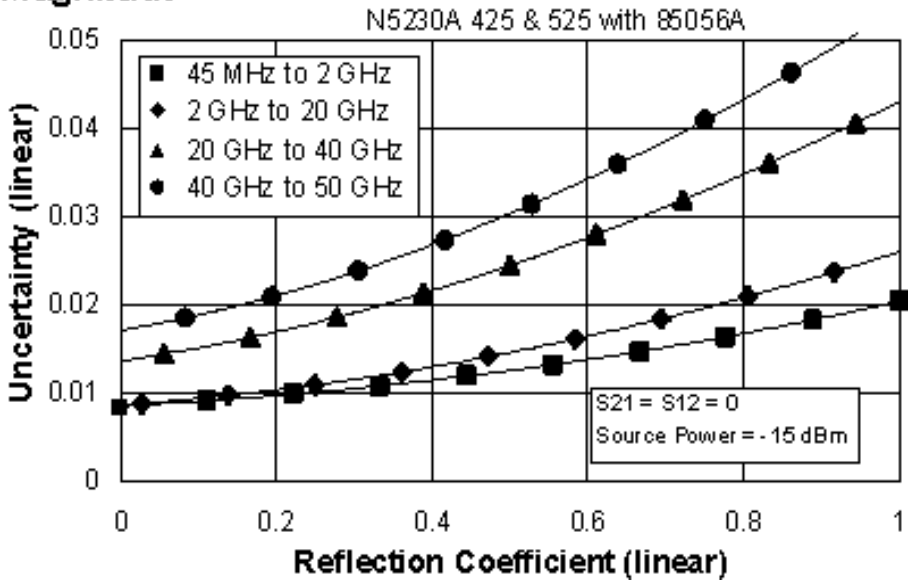


Phase



Reflection Uncertainty (Specifications)

Magnitude



Phase

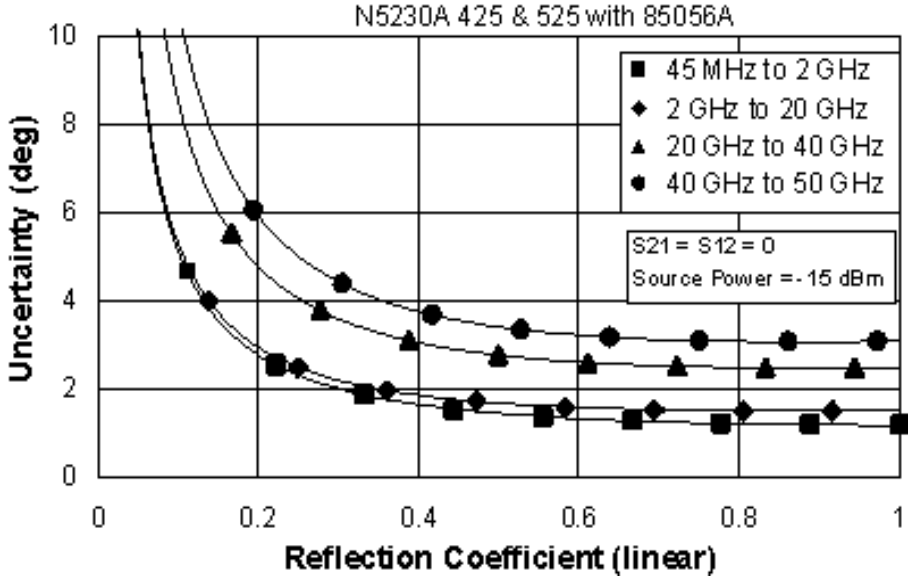


Table 11. N4693A Electronic Calibration Module N5230A/C- Option 420 or 520 (Standard Test Set and Standard Power Range)

Applies to the N5230A/C Option420 or 520 analyzers, N4693A (2.4mm) Electronic Calibration Module, 85133F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

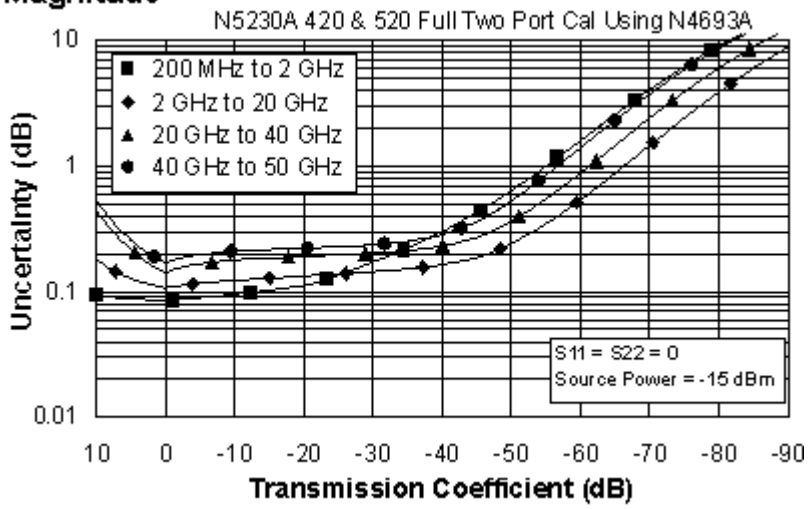
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Typical (dB)**	**Specification (dB)**			
	10 to 200 MHz	**45 MHz to 2 GHz**	**2 to 20 GHz**	**20 to 40 GHz**	**40 to 50 GHz**
Directivity	32	55	49	43	41
Source Match	25	46	42	35	30
Load Match	24	43	41	37	36
Reflection Tracking	±0.050 +0.02/°C	±0.030 +0.02/°C	±0.040 +0.02/°C	±0.060 +0.02/°C	±0.080 +0.03/°C
Transmission Tracking	±0.10 +0.02/°C	±0.056 +0.02/°C	±0.079 +0.02/°C	±0.107 +0.02/°C	±0.130 +0.03/°C

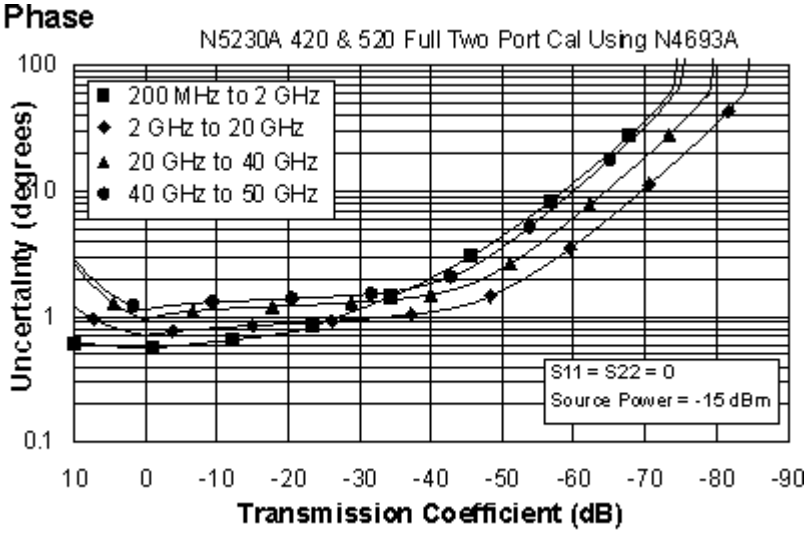
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude

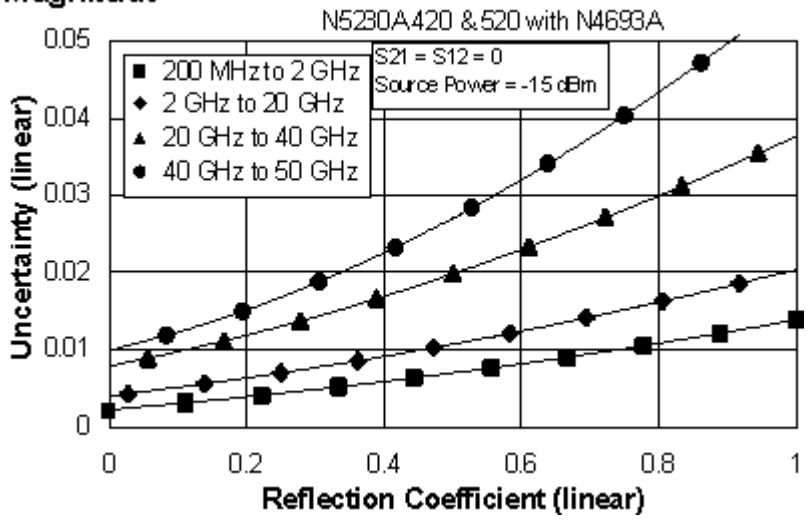


Phase



Reflection Uncertainty (Specifications)

Magnitude



Phase

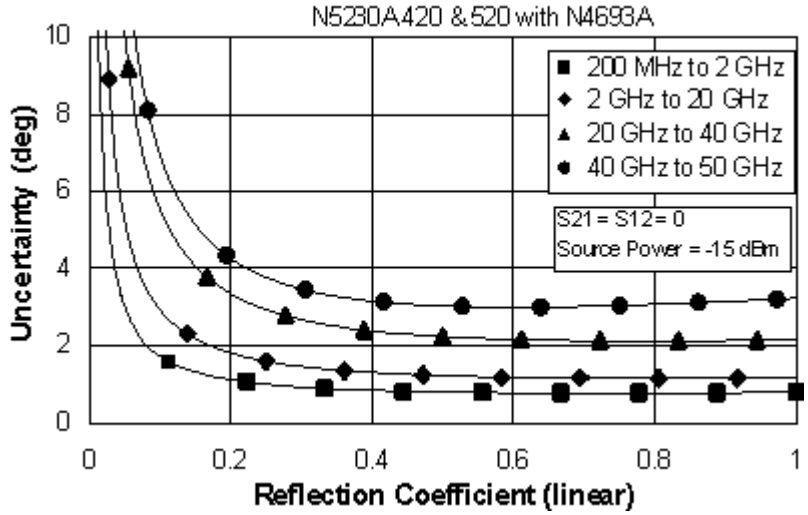


Table 12. N4693A Electronic Calibration Module
N5230A/C- Option 425 or 525 (Configurable Test Set and Extended Power Range)

Applies to the N5230A/C Option425 or 525 analyzers, N4693A(2.4mm) Electronic Calibration Module, 85133F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

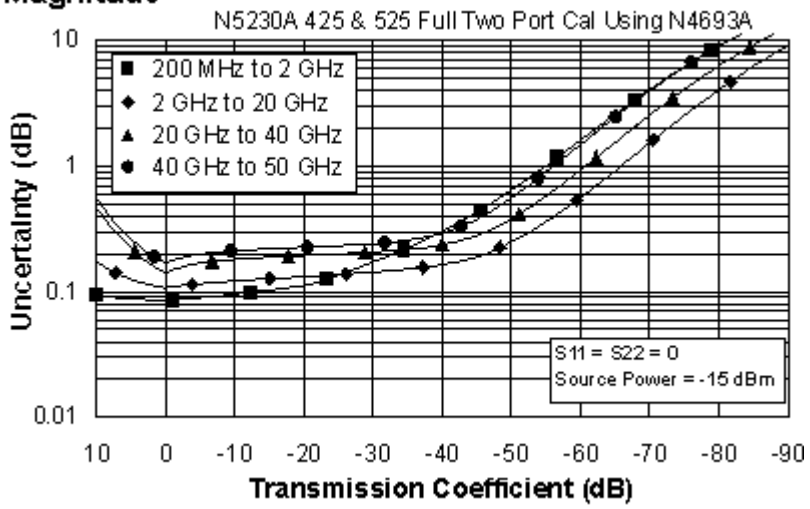
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Typical (dB)**	**Specification (dB)**			
	10 to 200 MHz	**200 MHz to 2 GHz**	**2 to 20 GHz**	**20 to 40 GHz**	**40 to 50 GHz**
Directivity	32	55	49	43	41
Source Match	25	46	42	35	30
Load Match	24	43	41	37	36
Reflection Tracking	±0.05 +0.02/°C	±0.030 +0.02/°C	±0.040 +0.02/°C	±0.060 +0.02/°C	±0.080 +0.03/°C
Transmission Tracking	±0.10 +0.02/°C	±0.056 +0.02/°C	±0.078 +0.02/°C	±0.107 +0.02/°C	±0.130 +0.03/°C

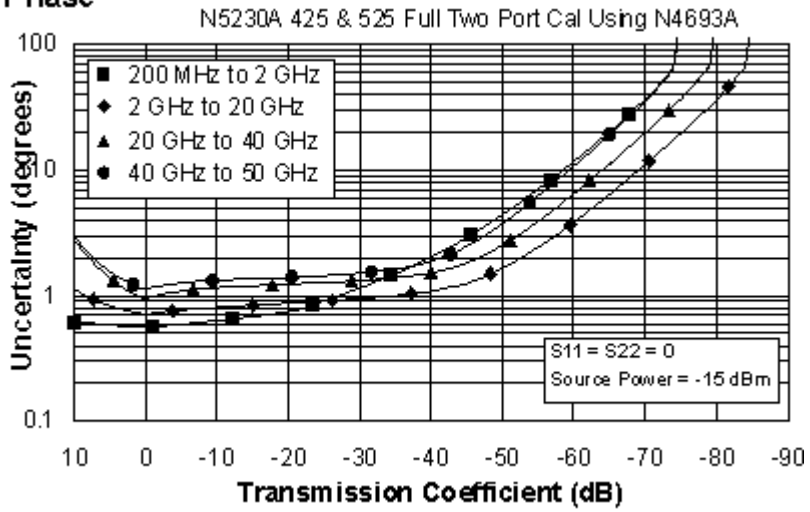
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude

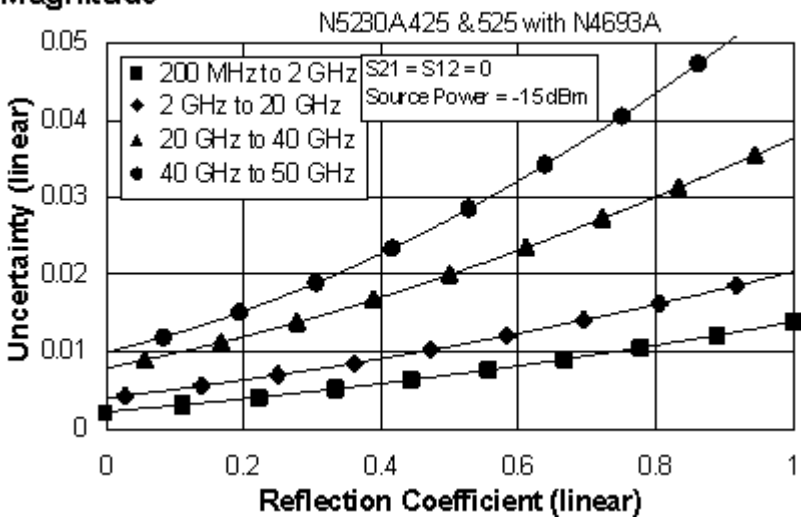


Phase

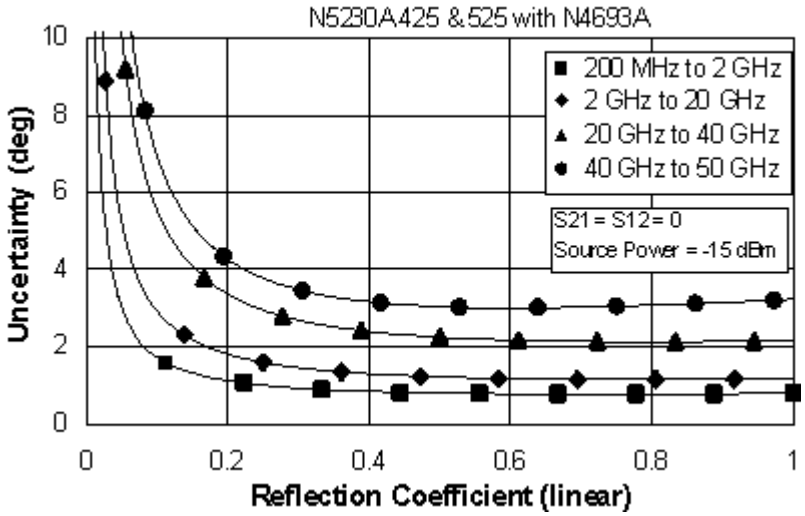


Reflection Uncertainty (Specifications)

Magnitude



Phase



N5230A/CCorrected System Performance with Type-N Connectors

85032B Calibration Kit

Table 13. 85032B Calibration Kit
N5230A/C- Option 020 (Standard Test Set and Standard Power Range)

Applies to the, N5230A/C Option 020 analyzers, 85032B (Type-N) calibration kit, 85132F flexible test port cable set with 85130C adapter set, and a full 2-port calibration. Also applies to the following condition:

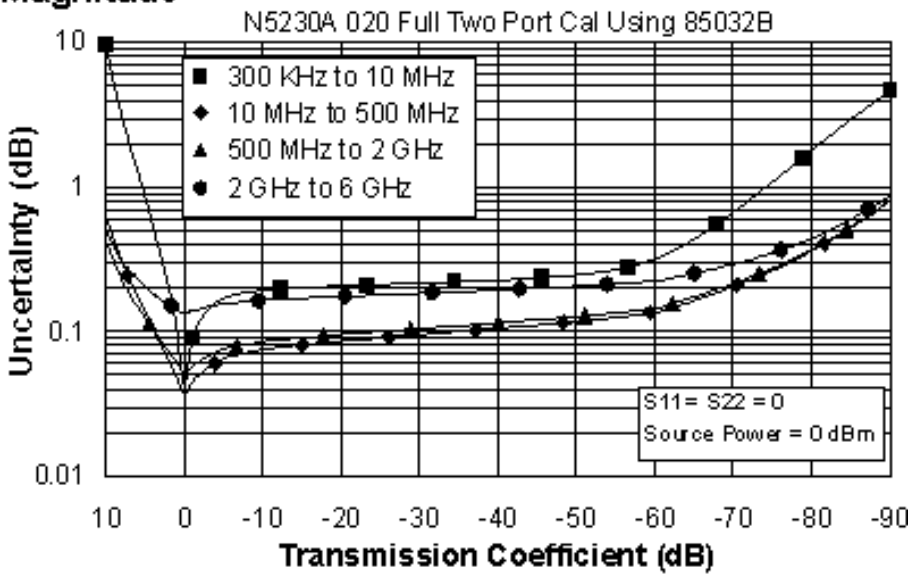
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	0.300 to 1 MHz	**1 to 10 MHz**	**10 to 45 MHz**	**45 MHz to 6 GHz**
Directivity	50	50	47	40
Source Match	42	42	37	31
Load Match	50	41	47	38
Reflection Tracking	±0.009 +0.01/°C	±0.009 +0.01/°C	±0.019 +0.01/°C	±0.069 +0.02/°C
Transmission Tracking	±0.013 +0.01/°C	±0.007 +0.01/°C	±0.021 +0.01/°C	±0.101 +0.02/°C

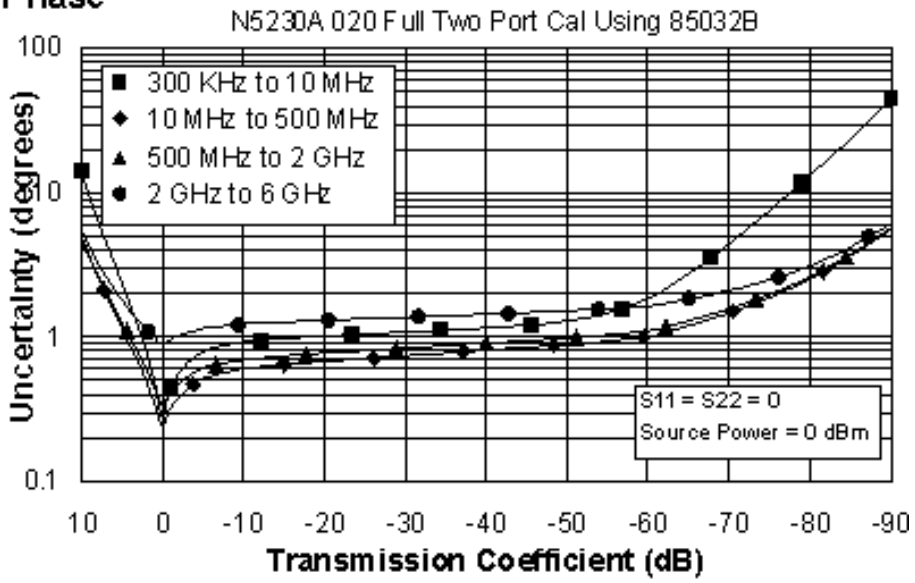
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude

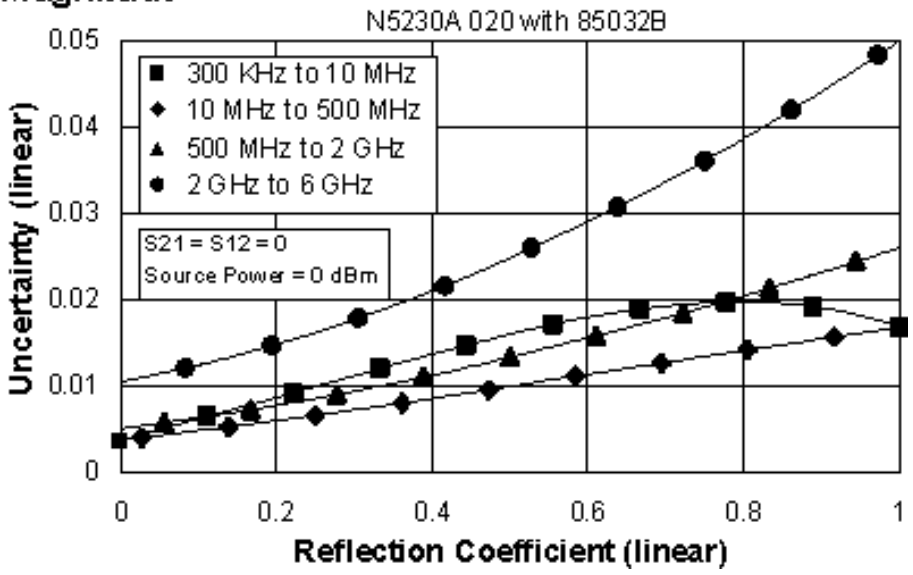


Phase



Reflection Uncertainty (Specifications)

Magnitude



Phase

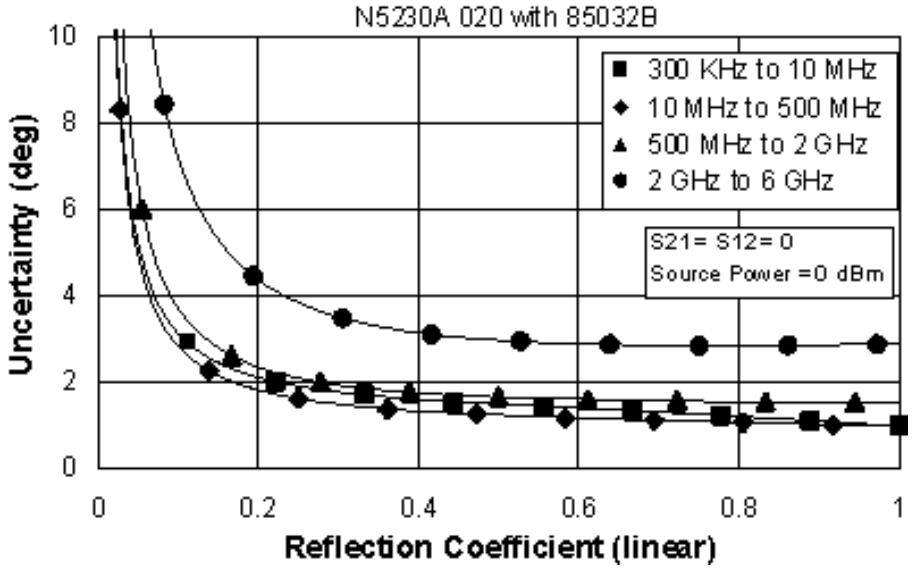


Table 14. 85032B Calibration Kit
N5230A/C- Option 025 (Configurable Test Set and Extended Power Range)

Applies to the, N5230A/C Option 025 analyzers, 85032B (Type-N) calibration kit, 85132F flexible test port cable set with 85130C adapter set, and a full 2-port calibration. Also applies to the following condition:

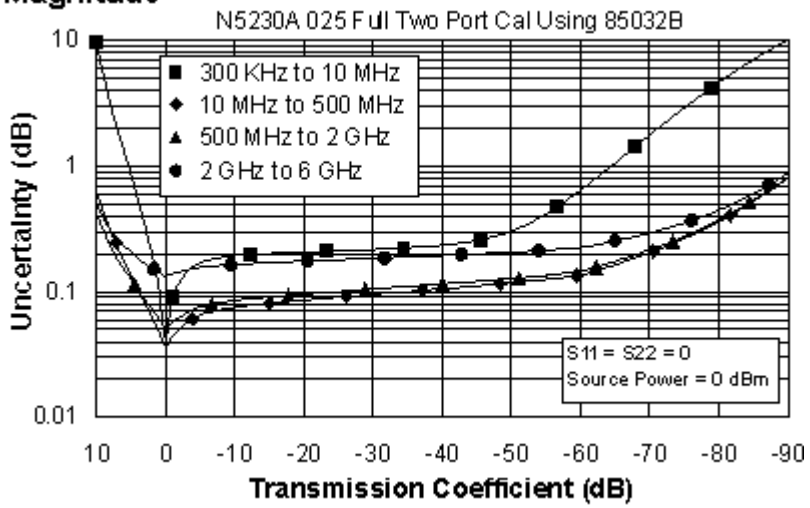
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	**Specification (dB)**			
	0.300 to 1 MHz	**1 to 10 MHz**	**10 to 45 MHz**	**45 MHz to 6 GHz**
Directivity	50	50	47	40
Source Match	42	42	37	31
Load Match	50	50	47	38
Reflection Tracking	±0.009 +0.01/°C	±0.009 +0.01/°C	±0.019 +0.01/°C	±0.069 +0.02/°C
Transmission Tracking	±0.013 +0.01/°C	±0.007 +0.01/°C	±0.021 +0.01/°C	±0.101 +0.02/°C

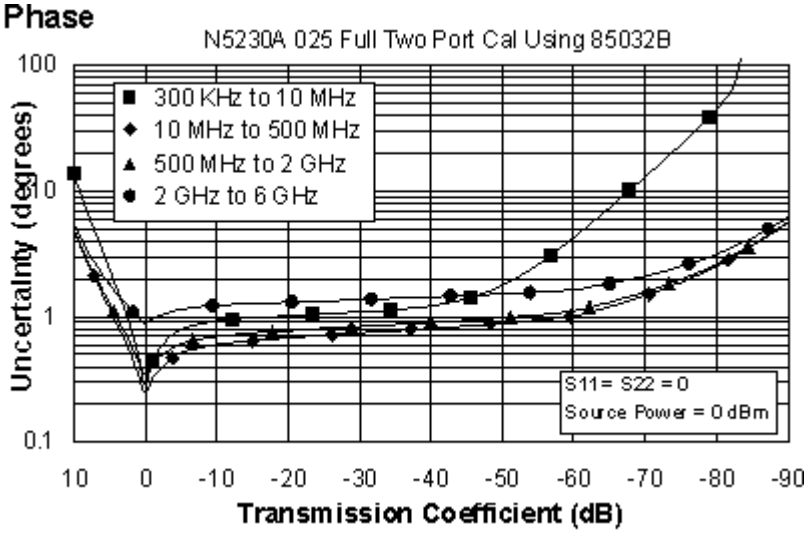
NOTE: The following graphs also apply to the "C" model of the analyzer.

Transmission Uncertainty (Specifications)

Magnitude



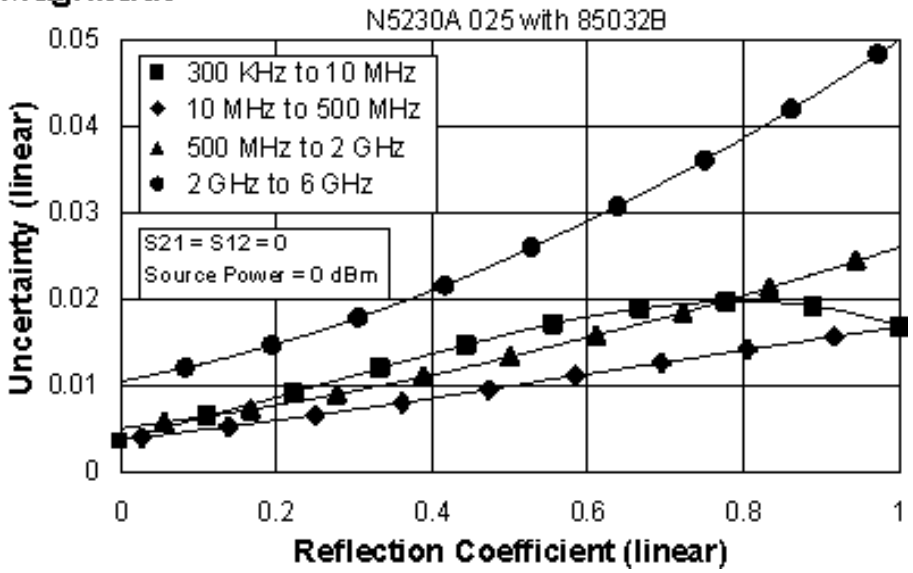
Phase



NOTE: The following graphs also apply to the "C" model of the analyzer.

Reflection Uncertainty (Specifications)

Magnitude



Phase

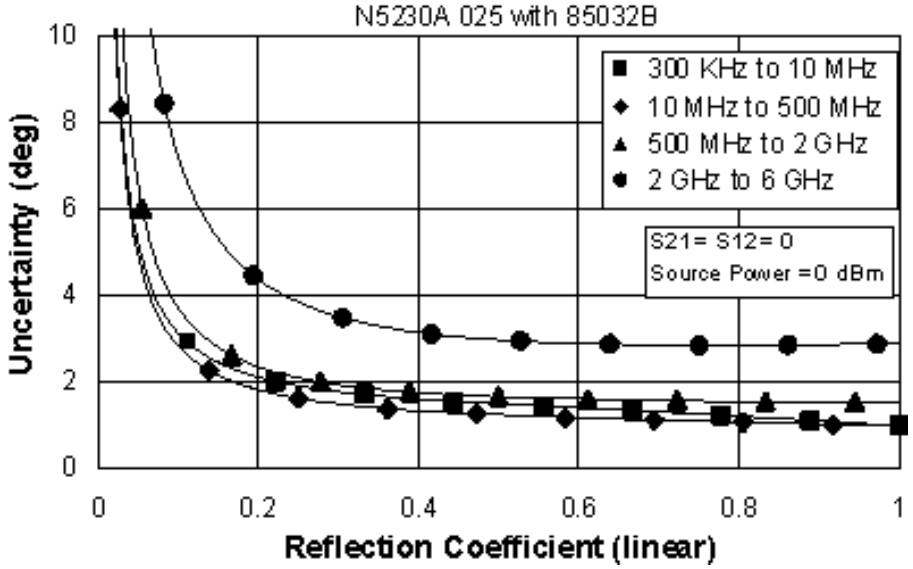


Table 15. Uncorrected System Performance

Description	Specifications				Typical			
	Options 020, 025, 120, 125	Options 220, 225	Options 420, 520	Options 425, 525	Options 020, 025, 120, 125	Options 220, 225	Options 420, 425	Options 520, 525
Directivity								
300 kHz to 10 MHz	16 dB	--	--	--	--	23 dB	--	
10 MHz to 45 MHz	28 dB	--	--	--	--		20 dB	20 dB
45 MHz to 500 MHz	28 dB	24 dB	23 dB	23 dB	--	--	--	--
500 MHz to 1 GHz	28 dB	27 dB	23 dB	23 dB	--	--	--	--
1 GHz to 2 GHz	25 dB	27 dB	23 dB	23 dB	--	--	--	--
2 GHz to 3 GHz	25 dB	21 dB	21 dB	21 dB	--	--	--	--
3 GHz to 5 GHz	20 dB	21 dB	21 dB	21 dB	--	--	--	--
5 GHz to 8 GHz	17 dB	21 dB	21 dB	21 dB	--	--	--	--
8 GHz to 11.5 GHz	17 dB	16 dB	16 dB	16 dB	--	--	--	--
11.5 GHz to 13.5 GHz	15 dB	16 dB	16 dB	16 dB	--	--	--	--
13.5 GHz to 20 GHz	--	16 dB	16 dB	16 dB	--	--	--	--
20 GHz to 40 GHz	--	--	15 dB	15 dB	--	--	--	--
45 GHz to 50 GHz	--	--	13 dB	13 dB	--	--	--	--

Table 15. Uncorrected System Performance (Continued)

	Options 020, 025, 120, 125	Options 220, 225	Options 420, 425	Options 520, 525	Options 020, 025, 120, 125	Options 220, 225	Options 420, 425	Options 520, 525
Source Match								
300 kHz to 10 MHz	18 dB	--	--	--	--	--	--	--
10 MHz to 45 MHz	25 dB	--	--	--	--	12 dB	11 dB	11 dB
45 MHz to 500 MHz	25 dB	20 dB	17 dB	17 dB	--	--	--	--
500 MHz to 2 GHz	21 dB	17 dB	17 dB	17 dB	--	--	--	--
2 GHz to 3 GHz	19 dB	12 dB	12 dB	12 dB	--	--	--	
3 GHz to 8 GHz	12 dB	12 dB	12 dB	12 dB	--	--	--	--
8 GHz to 9 GHz	12 dB	11 dB	11 dB	11 dB	--	--	--	
9 GHz to 12.5 GHz	10 dB	11 dB	11 dB	11 dB	--	--	--	--
12.5 GHz to 13.5 GHz	8 dB	10 dB	11 dB	11 dB	--	--	--	--
13.5 GHz to 20 GHz	--	10 dB	11 dB	11 dB	--	--	--	--
20 GHz to 40 GHz	--	--	7 dB	7 dB	--	--	--	--
40 GHz to 50 GHz	--	--	--	6 dB	--	--	--	--
Load Match								
300 kHz to 10 MHz	17 dB	--	--	--	--	--	--	--
10 MHz to 45 MHz	22 dB	--	--	--	--	15 dB	13 dB	13 dB
45 MHz to 500 MHz	22 dB	22 dB	18 dB	18 dB	--	--	--	--
500 MHz to 2 GHz	17 dB	20 dB	18 dB	18 dB	--	--	--	--
2 GHz to 3 GHz	14 dB	12 dB	14 dB	14 dB	--	--	--	--
3 GHz to 8 GHz	10 dB	12 dB	14 dB	14 dB	--	--	--	--
8 GHz to 9 GHz	9 dB	10 dB	12 dB	12 dB	--	--	--	--
9 GHz to 12.5 GHz	9 dB	10 dB	12 dB	12 dB	--	--	--	--
12.5 GHz to 13.5 GHz	7 dB	9 dB	9 dB	9.5 dB	--	--	--	--
13.5 GHz to 20 GHz	--	9 dB	9 dB	9.5 dB	--	--	--	--
20 GHz to 40 GHz	--	--	8 dB	8.5 dB	--	--	--	--
40 GHz to 50 GHz	--	--	--	5 dB	--	--	--	--

Table 15. Uncorrected System Performance (Continued)

Description		Specifications				Typical		
	Options 020, 025, 120, 125	Options 220, 225	Options 420, 425	Options 520, 525	Options 020, 025, 120, 125	Options 220, 225	Options 420, 425	Options 520, 525
Crosstalk[1]								
300 kHz to 10 MHz	--	--	--	--	75 dB[2]	--	--	--
10 MHz to 45 MHz	--	--	--	--	115 dB	88 dB	88 dB	88 dB
45 MHz to 500 MHz	--	--	--	--	122 dB	95 dB	94 dB	94 dB
500 MHz to 2 GHz	--	--	--	--	122 dB	96 dB	95 dB	95 dB
2 GHz to 8 GHz	--	--	--	--	122 dB	110 dB	108 dB	108 dB
8 GHz to 10.5 GHz	--	--	--	--	120 dB	116 dB	113 dB	113 dB
10.5 GHz to 12.5 GHz	--	--	--	--	115 dB	116 dB	113 dB	113 dB
12.5 GHz to 13.5 GHz	--	--	--	--	109 dB	115 dB	112 dB	112 dB
13.5 GHz to 20 GHz	--	--	--	--	--	115 dB	112 dB	112 dB
20 GHz to 40 GHz	--	--	--	--	--	--	97 dB	97 dB
40 GHz to 50 GHz	--	--	--	--	--	--	--	89 dB

[1] Measurement conditions: normalized to a thru, measured with two shorts, 10 Hz IF bandwidth, averaging factor of 8, alternate mode, source power set to the specified maximum power output or the minimum receiver input power specified by the 0.1 dB compression power.

[2] Value changed July 2006.

Table 16. Test Port Output[1]

	Specifications					Typicals			
	Options 020, 025	**Options 120, 125**	**Options 220, 225**	**Options 420, 425**	**Options 520, 525**	**Options 020, 025, 120, 125**	**Options 220, 225**	**Options 420, 425**	**Options 520, 525**
Frequency Range									
N5230A/C	300kHz to 6 GHz	300kHz to 13.5 GHz	10 MHz to 20 GHz	10 MHz to 40 GHz	10 MHz to 50 GHz	--			
Nominal Power									
Preset power; attenuator switch point 10 dB below nominal power									
	0 dBm	0 dBm	-5 dBm	-10 dBm	-15 dBm	--			
Frequency Resolution									
	1 Hz					--			
CW Accuracy									
	+/-1 ppm					--			
Frequency Stability									
	--					+/-0.05 ppm. -10° to 70° C[4] +/-0.1 ppm/yr maximum[5]			

Table 16. Test Port Output[1] (Continued)

		Specifications				Typical		
	Options 020, 025, 120, 125	**Options 220, 225**	**Options 420, 425**	**Options 520**	**Options 525**	**Options 020, 025, 120, 125**	**Options 220, 225**	**Options 420, 425, 520, 525**
Power Level Accuracy								
Variation from nominal power in range 0								
300 kHz to 10 MHz	+/-1.0 dB	--	--	--	--	--	--	--
10 MHz to 45 MHz	+/-1.0 dB	--	--	--	--	--	+/-0.5 dB	+/-0.5 dB
45 MHz to 6 GHz	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	--	--	--
6 GHz to 8 GHz	+/-1.5 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	--	--	--
8 GHz to 9 GHz	+/-1.5 dB	+/-1.0 dB	+/-1.5 dB	+/-1.5 dB	+/-1.5 dB	--	--	--
9 GHz to 10.5 GHz	+/-1.5 dB	+/-1.0 dB	+/-1.5 dB	+/-1.5 dB	+/-1.5 dB	--	--	--
10.5 GHz to 13.5 GHz	+/-2.0 dB	+/-1.0 dB	+/-1.5 dB	+/-1.5 dB	+/-1.5 dB	--	--	--
13.5 to 20 GHz	--	+/-1.0 dB	+/-1.5 dB	+/-1.5 dB	+/-1.5 dB	--	--	**--**
20 GHz to 40 GHz	--	--	+/-2.5 dB	+/-2.5 dB	+/-2.5 dB	--	--	**--**
40 GHz to 50 GHz	--	--	--	+/-3.5 dB	+/-3.5 dB	--	--	**--**

Table 16. Test Port Output[1] (Continued)

	Specifications							Typical
	Options 020, 120	**Options 025, 125**	**Options 220, 225**	**Option 420**	**Option 425**	**Option 520**	**Option 525**	**Options 220, 225**
Max Leveled Power								
300 kHz to 10 MHz	10 dBm	9 dBm	--	--	--	--	--	--
10 MHz to 45 MHz	10 dBm	9 dBm	--	--	--	--	--	5 dBm
45 MHz to 6 GHz	10 dBm	9 dBm	5 dBm	0 dBm	0 dBm	0 dBm	0 dBm	--
6 GHz to 9 GHz	8 dBm	8 dBm	5 dBm	0 dBm	0 dBm	0 dBm	0 dBm	--
9 GHz to 12.5 GHz	4 dBm	4 dBm	5 dBm	0 dBm	0 dBm	0 dBm	0 dBm	--
12.5 GHz to 13.5 GHz	2 dBm	1 dBm	3 dBm	0 dBm	0 dBm	0 dBm	0 dBm	--
13.5 GHz to 20 GHz	--	--	3 dBm	0 dBm	0 dBm	0 dBm	0 dBm	**--**
20 GHz to 40 GHz	--	--	--	-5 dBm	-8 dBm	-5 dBm	-8 dBm	**--**
40 GHz to 50 GHz	--	--	--	--	--	-11 dBm	-15 dBm	**--**
Power Level Linearity[2]								**Options as indicated**
Test reference is at the nominal power level								
300 kHz to 1 MHz	+/-4.5 dB	+/-4.5 dB	--	--	--	--	--	+/-2.0 dB (Opt 020, 025, 120, 125)
1 MHz to 10 MHz	+/-1.0 dB	+/-1.0 dB	--	--	--	--	--	--
10 MHz to 45 MHz	+/-2.0 dB	+/-2.0 dB	--	--	--	--	--	+/-0.35 dB (Opt 220 & 225) +/-0.40 dB (Opt 420, 425, 520, 525)
45 MHz to 1 GHz	+/-2.0 dB	+/-2.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	--
1 GHz to 12.5 GHz	+/-1.5 dB	+/-1.5 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	--
12.5 GHz to 13.5 GHz	+/-1.5 dB	+/-1.5 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	--
13.5 GHz to 20 GHz	--	--	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	--
20 GHz to 40 GHz	--	--	--	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	+/-1.0 dB	**--**
40 GHz to 50 GHz	--	--	--	--	--	+/-1.0 dB	+/-1.0 dB	**--**

Table 16. Test Port Output[1] (Continued)

	Specifications							Typical
	Options 020, 120	**Options 025, 125**	**Options 220, 225**	**Option 420**	**Option 425**	**Option 520**	**Option 525**	**Options 220, 225**
Power Sweep Range (ALC)[3]								
300 kHz to 10 MHz	37 dB	36 dB	--	--	--	--	--	--
10 MHz to 45 MHz	37 dB	36 dB	--	--	--	--	--	25 dB
45 MHz to 6 GHz	37 dB	36 dB	25 dB	25 dB	25 dB	25 dB	25 dB	--
6 GHz to 9 GHz	35 dB	35 dB	25 dB	25 dB	25 dB	25 dB	25 dB	--
9 GHz to 12.5 GHz	31 dB	31 dB	25 dB	25 dB	25 dB	25 dB	25 dB	--
12.5 GHz to 13.5 GHz	29 dB	28 dB	23 dB	25 dB	25 dB	25 dB	25 dB	--
13.5 GHz to 20 GHz	--	--	23 dB	25 dB	25 dB	25 dB	25 dB	--
20 GHz to 40 GHz	--	--	--	20 dB	17 dB	20 dB	17 dB	--
40 GHz to 50 GHz	--	--	--	--	--	14 dB	10 dB	--
Power Resolution								**Options as indicated**
								0.01 dB (all options)

Table 16. Test Port Output[1] (Continued)

	Specifications	Typical					
		Option 020, 120	Option 025, 125	Option 220	Option 225	Option 420, 520	Option 425, 525
Power Range							
300 kHz to 10 MHz	--	-30 to +10 dBm	-90 to +9 dBm	--	--	--	--
10 MHz to 45 MHz	--	-30 to +10 dBm	-90 to +9 dBm	-27 to +12 dBm	-87 to +12 dBm	-27 to +9 dBm	-87 to +8 dBm
45 MHz to 6 GHz	--	-30 to +10 dBm	-90 to +9 dBm	-27 to +12 dBm	-87 to +12 dBm	-27 to +8 dBm	-87 to +8 dBm
6 GHz to 9 GHz	--	-30 to +8 dBm	-90 to +8 dBm	-27 to +12 dBm	-87 to +12 dBm	-27 to +8 dBm	-87 to +8 dBm
9 GHz to 12.5 GHz	--	-30 to +4 dBm	-90 to +4 dBm	-27 to +12 dBm	-87 to +12 dBm	-27 to +8 dBm	-87 to +8 dBm
12.5 GHz to 13.5 GHz	--	-30 to +2 dBm	-90 to +1 dBm	-27 to +7 dBm	-87 to +7 dBm	-27 to +5 dBm	-87 to +4 dBm
13.5 GHz to 20 GHz	--	--	--	-27 to +7 dBm	-87 to +7 dBm	-27 to +5 dBm	-87 to +4 dBm
20 GHz to 40 GHz	--	--	--	--	--	-27 to +1 dBm	-87 to -2 dBm
40 GHz to 50 GHz	--	--	--	--	--	-27 to -5 dBm	-87 to -9 dBm
Power Settings							
Minimum Power Setting	--	-33 dBm	-93 dBm	-30 dBm	-90 dBm	-30 dBm	-90 dBm
Maximum Power Setting	--	+20 dBm					

Table 16. Test Port Output[1] (Continued)

Description	Specifications	Typical					
	--	Options 020, 025, 120, 125			Options 220, 225, 420, 425, 520, 525		
Phase Noise (Nominal power at test port)							
	--	**10 kHz Offset**	**100 kHz Offset**	**1 MHz Offset**	**10 kHz Offset**	**100 kHz Offset**	**1 MHz Offset**
300 kHz to 10 MHz	--	-86 dBc/Hz	-86 dBc/Hz	-95 dBc/Hz	--	--	--
10 MHz to 1.5 GHz	--	-86 dBc/Hz	-91 dBc/Hz	-95 dBc/Hz	-77 dBc/Hz	-77 dBc/Hz	-89 dBc/Hz
1.5 GHz to 3.125 GHz	--	-83 dBc/Hz	-91 dBc/Hz	-95 dBc/Hz	-83 dBc/Hz	-91 dBc/Hz	-95 dBc/Hz
3.125 GHz to 6.25 GHz	--	-77 dBc/Hz	-85 dBc/Hz	-89 dBc/Hz	-77 dBc/Hz	-85 dBc/Hz	-89 dBc/Hz
6.25 GHz to 12.5 GHz	--	-71 dBc/Hz	-79 dBc/Hz	-83 dBc/Hz	-71 dBc/Hz	-79 dBc/Hz	-83 dBc/Hz
12.5 GHz to 13.5 GHz	--	-65 dBc/Hz	-73 dBc/Hz	-77 dBc/Hz	-65 dBc/Hz	-73 dBc/Hz	-77 dBc/Hz
13.5 GHz to 20 GHz	--	--	--	--	-65 dBc/Hz	-73 dBc/Hz	-77 dBc/Hz
20 GHz to 40 GHz	--	--	--	--	-59 dBc/Hz	-67 dBc/Hz	-71 dBc/Hz
40 GHz to 50 GHz	--	--	--	--	-59 dBc/Hz	-67 dBc/Hz	-71 dBc/Hz

Table 16. Test Port Output[1] (Continued)

Description	Specifications	Typicals
	--	**Options 020, 025, 120, 125, 220, 225, 420, 520, 425, 525**
Non-Harmonic Spurious (at Nominal Output Power)[6]		
300 kHz to 10 MHz	--	-50 dBc for offset frequency > 1 kHz
10 MHz to 13.5 GHz	--	
13.5 GHz to 20 GHz	--	
20 GHz to 40 GHz	--	-30 dBc for offset frequency > 1 kHz
40 GHz to 50 GHz	--	

Table 16. Test Port Output[1] (Continued)

Description	Specifications	Typical			
	--	**Option 020, 025, 120, 125**	**Option 220, 225**	**Option 420, 520**	**Option 425, 525**
Harmonics (2nd or 3rd) at Maximum Output Power					
300 kHz to 10 MHz	--	-17 dBc	--	--	--
10 MHz to 500 MHz	--	-17 dBc	-22 dBc	-15 dBc	-15 dBc
500 MHz to 1 GHz	--	-17 dBc	-22 dBc	-15 dBc	-15 dBc
1 GHz to 13.5 GHz	--	-20 dBc	22 dBc	-20 dBc	-20 dBc
13.5 GHz to 20 GHz	--	--	-22 dBc	-20 dBc	-20 dBc
20 GHz to 40 GHz	--	--	--	-22 dBc	-22 dBc
40 GHz to 50 GHz	--	--	--	--	-22 dBc

[1]Performance specified on Port 1 only. Port 2 performance is a characteristic.

[2]Power level linearity specified on Port 1 only. Port 2 performance is Typical. Test reference is at the nominal power level.

[3]ALC range starts at maximum leveled power and decreases in power level by the dB amount specified here.
[4]Assumes no variation in time.
[5]Assumes no variation in temperature.

[6]Spurious signal levels are valid for a 10 MHz span centered on the carrier frequency. Spurious signals up to -15 dBc may exist outside the span. These signals do not affect the accuracy of the network analyzer measurements.

Table 17. Test Port Input

Description	Specification				Typical			
	Options 020, 025, 120, 125	**Options 220, 225**	**Options 420, 425**	**Options 520, 525**	**Options 020, 025, 120, 125**	**Options 220, 225**	**Options 420, 425**	**Options 520, 525**
Test Port Noise Floor[1]								
10 Hz IF Bandwidth[2]								
300 kHz to 3 MHz[3]	<-83 dBm	--	--	--	<-94 dBm	--	--	--
3 MHz to 10 MHz[4]	<-103 dBm	--	--	--	<-110 dBm	--	--	--
10 MHz to 45 MHz[4]	<-112 dBm	--	--	--	<-116 dBm	<-89 dBm	<-80 dBm	<-80 dBm
45 MHz to 70 MHz	<-112 dBm	<-96 dBm	<-90 dBm	<-90 dBm	<-116 dBm	--	--	--
70 MHz to 500 MHz	<-112 dBm	<-100 dBm	<-90 dBm	<-90 dBm	<-116 dBm	--	--	--
500 MHz to 2 GHz	<-112 dBm	<-105 dBm	<-110 dBm	<-110 dBm	<-120 dBm	--	--	--
2 GHz to 4 GHz	<-112 dBm	<-105 dBm	<-110 dBm	<-110 dBm	<-120 dBm	--	--	--
4 GHz to 8 GHz	<-112 dBm	<-105 dBm	<-110 dBm	<-110 dBm	<-119 dBm	--	--	--
8 GHz to 10.5 GHz	<-112 dBm	<-105 dBm	<-100 dBm	<-100 dBm	<-119 dBm	--	--	--
10.5 GHz to 13.5 GHz	<-107 dBm	<-105 dBm	<-100 dBm	<-100 dBm	<-114 dBm	--	--	--
13.5 GHz to 20 GHz	--	<-105 dBm	<-100 dBm	<-100 dBm	--	--	--	--
20 GHz to 31.25 GHz	--	--	<-100 dBm	<-100 dBm	--	--	--	--
31.25 GHz to 40 GHz	--	--	<-95 dBm	<-95 dBm	--	--	--	--
40 GHz to 50 GHz	--	--	--	<-90 dBm	--	--	--	--

Table 17. Test Port Input (Continued)

Description	Specification				Typical			
	Options 020, 025, 120, 125	Options 220, 225	Options 420, 425	Options 520, 525	Options 020, 025, 120, 125	Options 220, 225	Options 420, 425	Options 520, 525
Test Port Noise Floor[1] (Continued)								
1 KHz IF Bandwidth								
300 kHz to 3 MHz[3]	<-73 dBm	--	--	--	<-83 dBm	--	--	--
3 MHz to 10 MHz[4]	<-83 dBm	--	--	--	<-90 dBm	--	--	--
10 MHz to 45 MHz[4]	<-92 dBm	--	--	--	<-96 dBm	<-69 dBm	<-60 dBm	<-60 dBm
45 MHz to 70 MHz	<-92 dBm	<-76 dBm	<-70 dBm	<-70 dBm	<-96 dBm	--	--	--
70 MHz to 500 MHz	<-92 dBm	<-80 dBm	<-70 dBm	<-70 dBm	<-96 dBm	--	--	--
500 MHz to 2 GHz	<-92 dBm	<-85 dBm	<-90 dBm	<-90 dBm	<-100 dBm	--	--	--
2 GHz to 4 GHz	<-92 dBm	<-85 dBm	<-90 dBm	<-90 dBm	<-100 dBm	--	--	--
4 GHz to 8 GHz	<-92 dBm	<-85 dBm	<-90 dBm	<-90 dBm	<-99 dBm	--	--	--
8 GHz to 10.5 GHz	<-92 dBm	<-85 dBm	<-80 dBm	<-80 dBm	<-99 dBm	--	--	--
10.5 GHz to 13.5 GHz	<-87 dBm	<-85 dBm	<-80 dBm	<-80 dBm	<-94 dBm	--	--	--
13.5 GHz to 20 GHz	--	<-85 dBm	<-80 dBm	<-80 dBm	--	--	--	--
20 GHz to 31.25 GHz	--	--	<-80 dBm	<-80 dBm	--	--	--	--
31.25 GHz to 40 GHz	--	--	<-75 dBm	<-75 dBm	--	--	--	--
40 GHz to 50 GHz	--	--	--	<-70 dBm	--	--	--	--

Table 17. Test Port Input (Continued)

Description		Specification				Typical		
	Options 025, 125	Options 225	Options 425	Options 525	Options 025, 125	Options 225	Options 425	Options 525
Direct Receiver Access Input Noise Floor[1] (Options 025, 125, 225, 425, and 525 only)								
10 Hz IF Bandwidth[2]								
300 kHz to 3 MHz[3]	<-99 dBm	--	--	--	--	--	--	--
3 MHz to 10 MHz[4]	<-119 dBm	--	--	--	--	--	--	--
10 MHz to 45 MHz[4]	<-128 dBm	--	--	--	--	<-120 dBm	<-126 dBm	<-126 dBm
45 MHz to 70 MHz	<-128 dBm	<-108 dBm	<-111 dBm	<-111 dBm	--	--	--	--
70 MHz to 500 MHz	<-128 dBm	<-112 dBm	<-111 dBm	<-111 dBm	--	--	--	--
500 MHz to 2 GHz	<-128 dBm	<-117 dBm	<-122 dBm	<-122 dBm	--	--	--	--
2 GHz to 8 GHz	<-128 dBm	<-117 dBm	<-122 dBm	<-122 dBm	--	--	--	--
8 GHz to 10.5 GHz	<-128 dBm	<-117 dBm	<-112 dBm	<-112 dBm	--	--	--	--
10.5 GHz to 13.5 GHz	<-128 dBm	<-117 dBm	<-112 dBm	<-112 dBm	--	--	--	--
13.5 GHz to 20 GHz		<-117 dBm	<-112 dBm	<-112 dBm	--	--	--	--
20 GHz to 31.25 GHz	--	--	<-111 dBm	<-111 dBm	--	--	--	--
31.25 GHz to 40 GHz	--	--	<-106 dBm	<-106 dBm	--	--	--	--
40 GHz to 50 GHz	--	--	--	<-98 dBm	--	--	--	--

Table 17. Test Port Input (Continued)

Description		Specification				Typical		
	Options 025, 125	Options 225	Options 425	Options 525	Options 025, 125	Options 225	Options 425	Options 525
Direct Receiver Access Input Noise Floor[1] (Options 025, 125, 225, 425, and 525 only) (Continued)								
1 KHz IF Bandwidth								
300 kHz to 3 MHz[3]	<-89 dBm	--	--	--	--	--	--	--
3 MHz to 10 MHz[4]	<-99 dBm	--	--	--	--	--	--	--
10 MHz to 45 MHz[4]	<-108 dBm	--	--	--	--	<-100 dBm	<-106 dBm	<-106 dBm
45 MHz to 70 MHz	<-108 dBm	<-88 dBm	<-91 dBm	<-91 dBm	--	--	--	--
70 MHz to 500 MHz	<-108 dBm	<-92 dBm	<-91 dBm	<-91 dBm	--	--	--	--
500 MHz to 2 GHz	<-108 dBm	<-97 dBm	<-102 dBm	<-102 dBm	--	--	--	--
2 GHz to 8 GHz	<-108 dBm	<-97 dBm	<-102 dBm	<-102 dBm	--	--	--	--
8 GHz to 10.5 GHz	<-108 dBm	<-97 dBm	<-92 dBm	<-92 dBm	--	--	--	--
10.5 GHz to 13.5 GHz	<-108 dBm	<-97 dBm	<-92 dBm	<-92 dBm	--			
13.5 GHz to 20 GHz		<-97 dBm	<-92 dBm	<-92 dBm	--	--	--	--
20 GHz to 31.25 GHz	--	--	<-91 dBm	<-91 dBm	--	--	--	--
31.25 GHz to 40 GHz	--	--	<-86 dBm	<-86 dBm	--	--	--	--
40 GHz to 50 GHz	--	--	--	<-78 dBm	--	--	--	--

Table 17. Test Port Input (Continued)

Description	Specification						Typical		
	Options 220, 225		Options 420, 520		Options 425, 525		Options 220, 225		
Compression Level									
	Power	**Com-pression**	**Power**	**Com-pression**	**Power**	**Com-pression**	**Power**	**Com-pression**	
10 MHz to 45 MHz[5]	--	--	--	--	--	--	+5 dBm	0.10 dB	
45 MHz to 500 MHz	+5 dBm	0.10 dB	+5 dBm	0.40 dB	+5 dBm	0.40 dB	--	--	
500 MHz to 2 GHz	+5 dBm	0.15 dB	+5 dBm	0.77 dB	+5 dBm	0.67 dB	--	--	
2 GHz to 8 GHz	+5 dBm	0.21 dB	+5 dBm	0.75 dB	+5 dBm	0.55 dB	--	--	
8 GHz to 12.5 GHz	+5 dBm	0.21 dB	+5 dBm	0.56 dB	+5 dBm	0.51 dB	--	--	
12.5 GHz to 20 GHz	+3 dBm	0.20 dB	+5 dBm	0.79 dB	+5 dBm	0.69 dB	--	--	
20 GHz to 31.25 GHz	--	--	0 dBm	0.60 dB	0 dBm	0.50 dB	--	--	
31.25 GHz to 40 GHz	--	--	-3 dBm	0.55 dB	-3 dBm	0.60 dB	--	--	
40 GHz to 50 GHz	--	--	-3 dBm	0.66 dB	-3 dBm	0.71 dB	--	--	

Table 17. Test Port Input (Continued)

Description	Specification		Typical	
	Options 020, 120, 025, 125			
Compression Level (continued)				
	Power	**Compression**	**Power**	**Compression**
300 kHz to 10 MHz	+8 dBm	1.0 dB	--	0.1 dB at +5 dBm
10 MHz to 50 MHz	+8 dBm	0.35 dB	--	--
50 MHz to 1GHz	+8 dBm	0.35 dB	--	--
1 GHz to 6 GHz	+8 dBm	0.25 dB	--	--
6 GHz to 8 GHz	+8 dBm	0.25 dB	--	--
8 GHz to 12.5 GHz	+8 dBm	0.30 dB	--	--
12.5 GHz to 13.5 GHz	+8 dBm	0.40 dB	--	--

Table 17. Test Port Input (Continued)

Description	Specification		Typical	
			Options 020, 120, 025, 125	
Test Port Compression - 0.1 dB				
			Power	**Compression**
300 kHz to 10 MHz	--	--	+5 dBm	0.1 dB
10 MHz to 1 GHz	--	--	+9 dBm	0.1 dB
1 GHz to 12.5 GHz	--	--	+10 dBm	0.1 dB
12.5 GHz to 13.5 GHz	--	--	+9 dBm	0.1 dB

Table 17. Test Port Input (Continued)

	Specification			Typical			
	Options 220, 225	**Options 420, 425**	**Options 520, 525**	**Option 220**	**Option 225**	**Options 420, 425**	**Options 520, 525**
Test Port Compression - 0.1 dB (continued)							
300 kHz to 10 MHz	--	--	--	--	--	--	--
10 MHz to 45 MHz[2]	--	--	--	+10 dBm	negligible	negligible	negligible
45 MHz to 500 MHz	--	--	--	+10 dBm	+10 dBm	0.0 dBm	+1.0 dBm
500 MHz to 2 GHz	--	--	--	+9 dBm	+9 dBm	0.0 dBm	+1.0 dBm
2 GHz to 12.5 GHz	--	--	--	+6 dBm	+6 dBm	0.0 dBm	+1.5 dBm
12.5 GHz to 13.5 GHz	--	--	--	+6 dBm	+6 dBm	-1.0 dBm	0.0 dBm
13.5 GHz to 20 GHz	--	--	--	+6 dBm	+6 dBm	-1.0 dBm	0.0 dBm
20 GHz to 31.25 GHz	--	--	--	--	--	-5.5 dBm	-3.0 dBm
31.25 GHz to 40 GHz	--	--	--	--	--	-8.5 dBm	-7.5 dBm
40 GHz to 50 GHz	--	--	--	--	--	--	-10.0 dBm

Table 17. Test Port Input (Continued)

Trace Noise Magnitude[6] 1 kHz IF bandwidth, ratioed measurement, nominal power at test port.						
300 kHz to 10 MHz	--	--	--	--	--	--
10 MHz to 45 MHz	--	--	--	0.004 dB rms	0.015 dB rms	0.015 dB rms
45 MHz to 500 MHz	0.004 dB rms	0.010 dB rms	0.010 dB rms	--	--	--
500 MHz to 2 GHz	0.004 dB rms	0.006 dB rms	0.006 dB rms	--	--	--
2 GHz to 10.5 GHz	0.004 dB rms	0.006 dB rms	0.006 dB rms	--	--	--
10.5 GHz to 13.5 GHz	0.006 dB rms	0.010 dB rms	0.010 dB rms	--	--	--
13.5 GHz to 20 GHz	0.006 dB rms	0.010 dB rms	0.010 dB rms	--	--	--
20 GHz to 31.25 GHz	--	0.010 dB rms	0.010 dB rms	--	--	--
31.25 GHz to 40 GHz	--	0.020 dB rms	0.020 dB rms	--	--	--
40 GHz to 50 GHz	--	--	0.020 dB rms	--	--	--

Table 17. Test Port Input (Continued)

	Specification	Typical
	Options 020, 120, 025, 125	**Options 020, 120, 025, 125**
Trace Noise Magnitude[6] (continued)		
100 kHz IF bandwidth, ratioed measurement, nominal power at test port		
300 kHz to 10 MHz	12 mdB	--
10 MHz to 6 GHz	4 mdB	--
6 GHz to 10.5 GHz	4 mdB	--
10.5 GHz to 13.5 GHz	8 mdB	--
600 kHz IF bandwidth, ratioed measurement, nominal power at test port		
300 kHz to 10 MHz	**--**	20 mdB
10 MHz to 6 GHz	**--**	8 mdB
6 GHz to 10.5 GHz	**--**	8 mdB
10.5 GHz to 13.5 GHz	**--**	10 mdB

Table 17. Test Port Input (Continued)

Description	Specification			Typical		
	Options 220, 225	**Options 420, 520**	**Options 425, 525**	**Options 220, 225**	**Options 420, 520**	**Options 425, 525**
Trace Noise Phase[6] 1 kHz IF bandwidth, ratioed measurement, nominal power at test port.						
300 kHz to 10 MHz						
10 MHz to 45 MHz	--	--	--	0.025° rms	0.100° rms	0.100° rms
45 MHz to 500 MHz	0.060° rms	0.100° rms	0.100° rms	--	**--**	--
500 MHz to 2 GHz	0.060° rms	0.060° rms	0.060° rms	--	**--**	--
2 GHz to 10.5 GHz	0.060° rms	0.060° rms	0.060° rms	--	**--**	--
10.5 GHz to 13.5 GHz	0.060° rms	0.100° rms	0.100° rms			
13.5 GHz to 20 GHz	0.060° rms	0.100° rms	0.100° rms	--	**--**	--
20 GHz to 31.25 GHz	--	0.100° rms	0.100° rms	--	**--**	--
31.25 GHz to 40 GHz	--	0.200° rms	0.200° rms	--	**--**	--
40 GHz to 50 GHz	--	--	0.200° rms	--	**--**	--

Table 17. Test Port Input (Continued)

Description	Specification	Technical
	Options 020, 120, 025, 125	**Options 020, 120, 025, 125**
Trace Noise Phase[6] (continued)		
100 kHz IF bandwidth, ratioed measurement, nominal power at test port		
300 kHz to 10 MHz	80 mdeg	--
10 MHz to 6 GHz	30 mdeg	--
6 GHz to 10.5 GHz	30 mdeg	--
10.5 GHz to 13.5 GHz	60 mdeg	--
600 kHz IF bandwidth, ratioed measurement, nominal power at test port		
300 kHz to 10 MHz	--	100 mdeg
10 MHz to 6 GHz	--	60 mdeg
6 GHz to 10.5 GHz	--	60 mdeg
10.5 GHz to 13.5 GHz	--	80 mdeg

Table 17. Test Port Input (Continued)

Description	Specification	Typical
	Options 020, 025, 120, 125, 220, 225, 420, 425, 520, 525	**--**
Reference Level Magnitude		
Range	+/-200 dB	
Resolution	0.001dB	
Reference Level Phase		
Range	+/-500°	
Resolution	0.01°	

Table 17. Test Port Input (Continued)

Description	Specification				Typical		
	--	--	--	--	**Option 020, 025, 120, 125**	**Option 220, 225**	**Options 420, 425, 520, 525**
Stability Magnitude[7]							
300 kHz to 10 MHz	--	--	--	--	+/-0.015 dB/°C	--	--
10 MHz to 45 MHz	--	--	--	--	+/-0.010 dB/°C	+/-0.015 dB/°C	+/-0.015 dB/°C
45 MHz to 500 MHz	--	--	--	--	+/-0.010 dB/°C	+/-0.010 dB/°C	+/-0.010 dB/°C
500 MHz to 2 GHz	--	--	--	--	+/-0.010 dB/°C	+/-0.010 dB/°C	+/-0.010 dB/°C
2 GHz to 4 GHz	--	--	--	--	+/-0.015 dB/°C	+/-0.020 dB/°C	+/-0.010 dB/°C
4 GHz to 8 GHz	--	--	--	--	+/-0.020 dB/°C	+/-0.020 dB/°C	+/-0.010 dB/°C
8 GHz to 13.5 GHz	--	--	--	--	+/-0.020 dB/°C	+/-0.030 dB/°C	+/-0.015 dB/°C
13.5 GHz to 20 GHz	--	--	--	--	--	+/-0.030 dB/°C	+/-0.015 dB/°C
20 GHz to 40 GHz	--	--	--	--	--	--	+/-0.040 dB/°C
40 GHz to 50 GHz	--	--	--	--	--	--	+/-0.060 dB/°C
Stability Phase[7]							
300 kHz to 10 MHz	--	--	--	--	+/-0.30°/°C	--	--
10 MHz to 45 MHz	--	--	--	--	+/-0.025°/°C	+/-0.25°/°C	+/-0.25°/°C
45 MHz to 500 MHz	--	--	--	--	+/-0.035°/°C	+/-0.20°/°C	+/-0.22°/°C
500 MHz to 2 GHz	--	--	--	--	+/-0.050°/°C	+/-0.15°/°C	+/-0.22°/°C
2 GHz to 4 GHz	--	--	--	--	+/-0.10°/°C	+/-0.15°/°C	+/-0.10°/°C
4 GHz to 8 GHz	--	--	--	--	+/-0.15°/°C	+/-0.15°/°C	+/-0.10°/°C
8 GHz to 13.5 GHz	--	--	--	--	+/-0.30°/°C	+/-0.45°/°C	+/-0.15°/°C
13.5 GHz to 20 GHz	--	--	--	--	--	+/-0.45°/°C	+/-0.15°/°C
20 GHz to 40 GHz	--	--	--	--	--	--	+/-0.40°/°C
40 GHz to 50 GHz	--	--	--	--	--	--	+/-0.40°/°C

Table 17. Test Port Input (Continued)

Description	Specifications	Typical				
		Options 020, 120	**Option 220**	**Options 420, 520**	**Options 025, 125**	**Options 225, 425, 525**
Damage Input Level						
Test Port 1 and 2	--	+27 dBm or +/- 16 VDC	+30 dBm or +/-25 VDC	+30 dBm or +/-40 VDC	+27 dBm or +/- 16 VDC	+27 dBm or +/- 7 VDC
R1, R2 in	--	--	--	--	+15 dBm or +/- 16 VDC	+15 dBm or +/-7 VDC
A, B in	--	--	--	--	+15 dBm or +/- 16 VDC	+15 dBm or +/-7 VDC
Coupler Thru	--	--	--	--	+27 dBm or +/- 16 VDC	+30 dBm or +/-40 VDC
Coupler Arm	--	--	--	--	+15 dBm or +/- 0 VDC	+30 dBm or +/-7 VDC

[1] Total average (rms) noise power calculated as the mean value of a linear magnitude trace expressed in dBm.

[2] 10 Hz IFBW test port noise floor performance is mathematically derived from the 1 kHz IFBW noise floor performance. The performance cold be limited by crosstalk below 3 MHz at certain frequencies. The measurement is defined as a single receiver measurement with loads on the ports at a given CW frequency with power set to the minimum plus 5 dB.

[3] Value and/or frequency changed July 2006.

[4] May be degraded typically by 10 dB at particular frequencies (multiples of 5 MHz) below 500 MHz due to spurious receiver residuals.

[5] For Options 225, 420, 425, 520, 525 - coupler roll-off will reduce compression to a negligible level below 45 MHz.

[6] 1 kHz IF BW, ratioed measurement, nominal power at the test port.

[7] Stability is defined as a ratio measurement made at the test port.

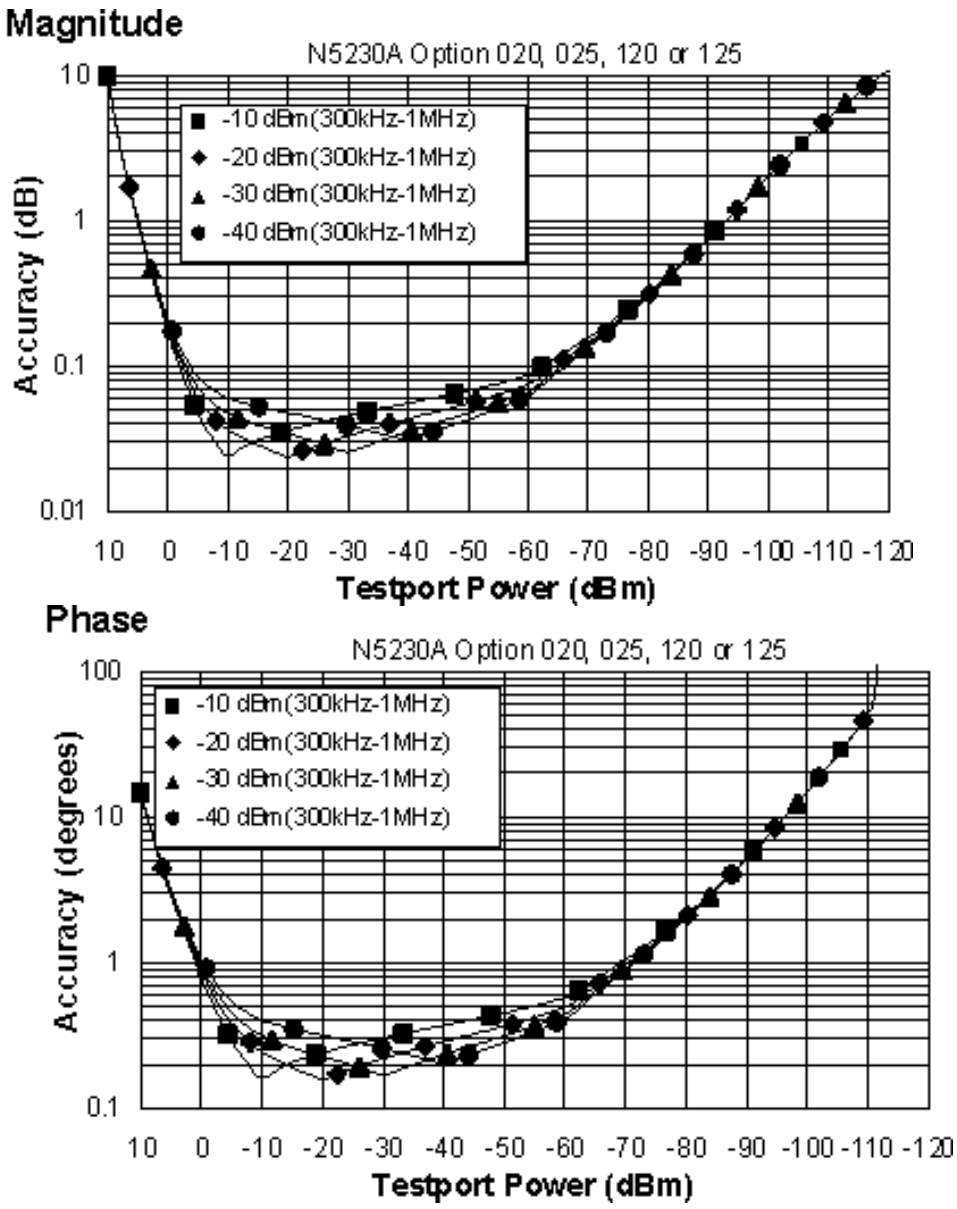
Table 18. Dynamic Accuracy (Specification[a])

Accuracy of the test port input power reading relative to the reference input power level.

NOTE: The following graphs also apply to the "C" model of the analyzer.

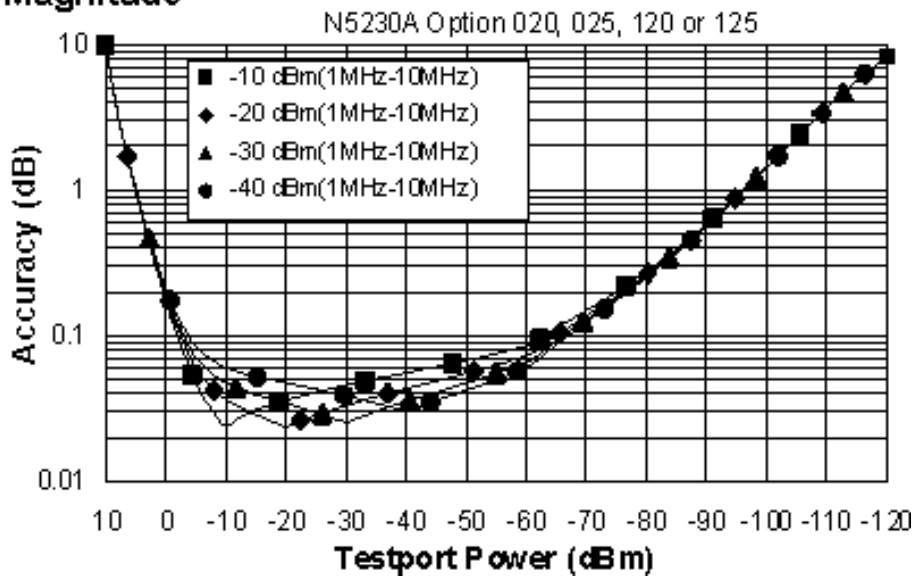
Options 020, 025, 120, 125

Dynamic Accuracy, 300 kHz - 1 MHz, Option 020, 025, 120, or 125

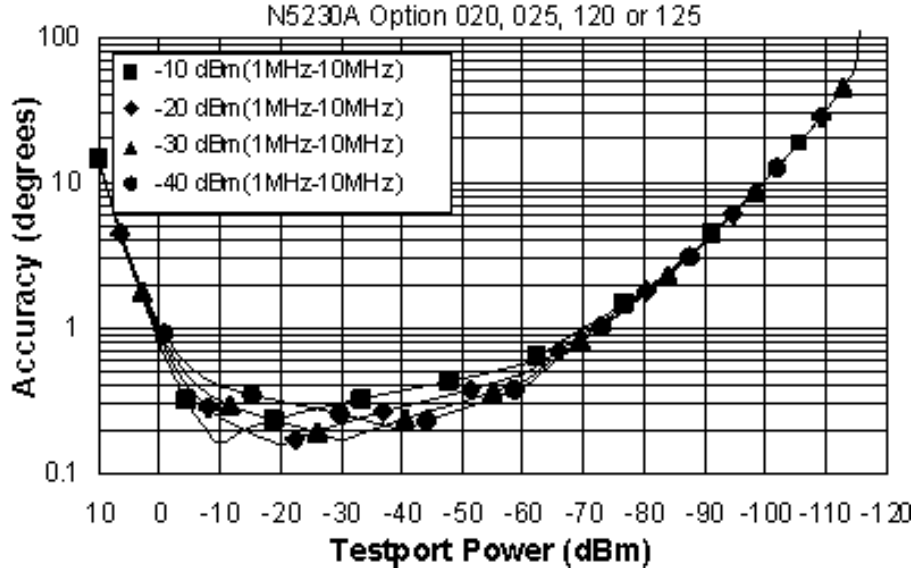


Dynamic Accuracy, 1 MHz- 10 MHz, Option 020, 025, 120, or 125

Magnitude

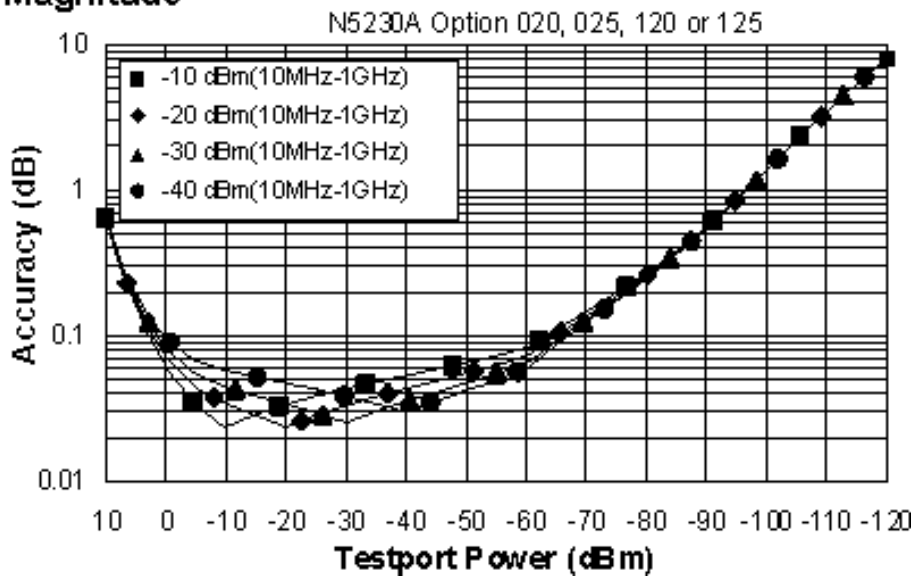


Phase

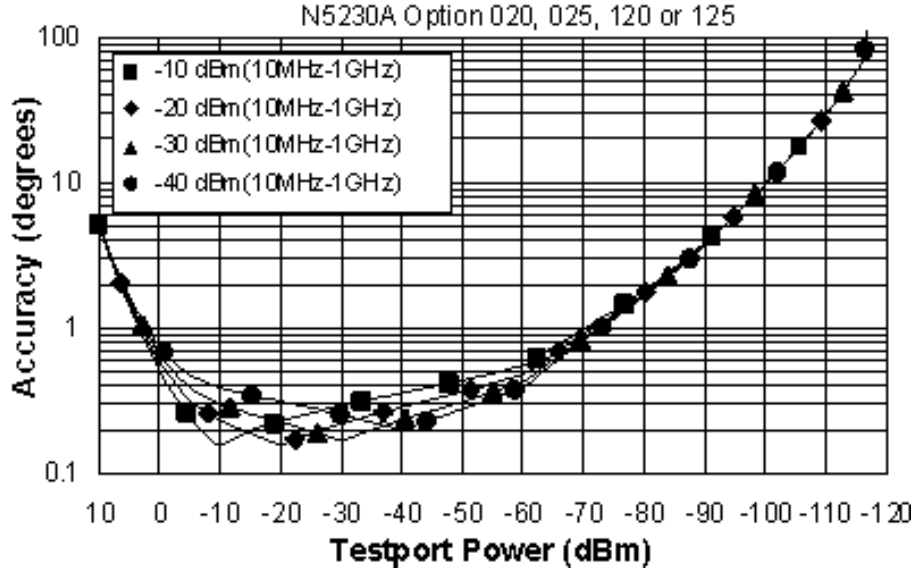


Dynamic Accuracy, 10 MHz- 1 GHz, Option 020, 025, 120, or 125

Magnitude

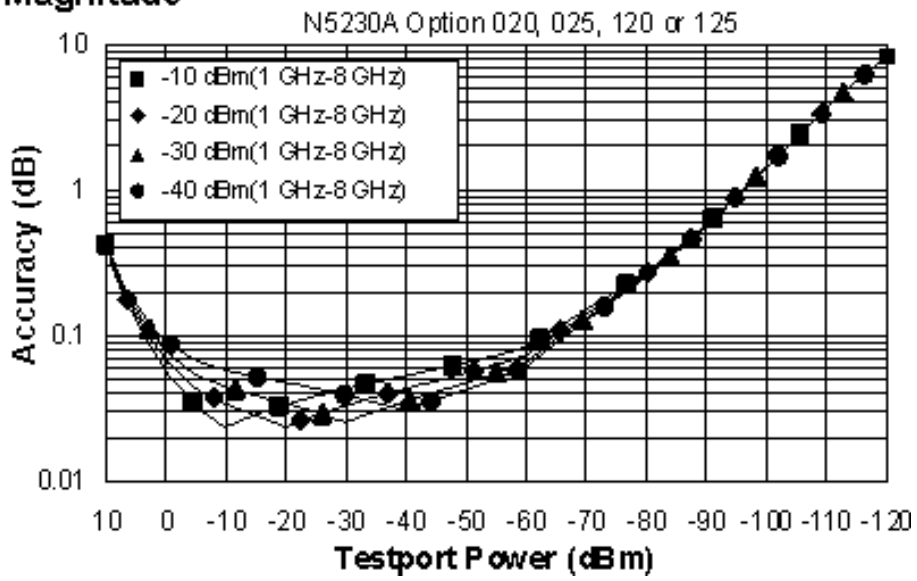


Phase

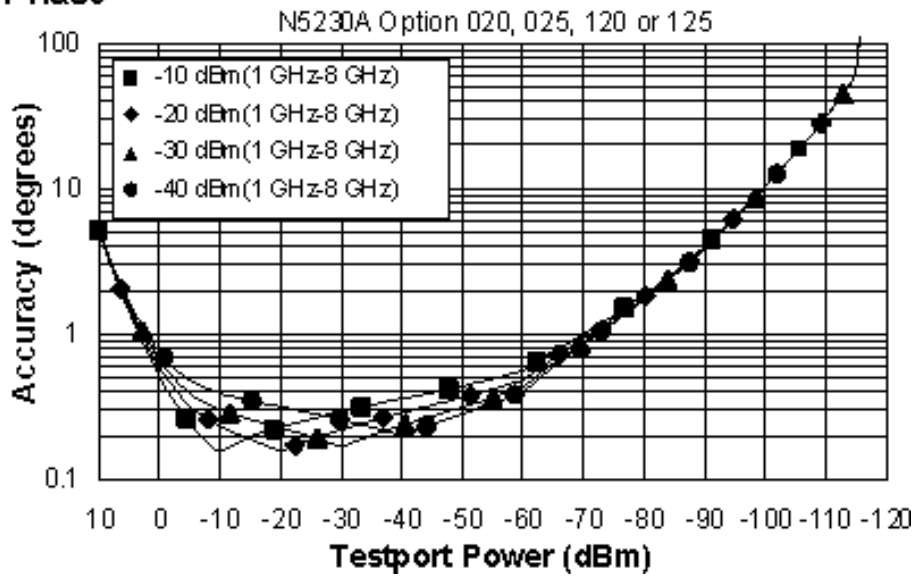


Dynamic Accuracy, 1 - 8 GHz, Option 020, 025, 120, or 125

Magnitude

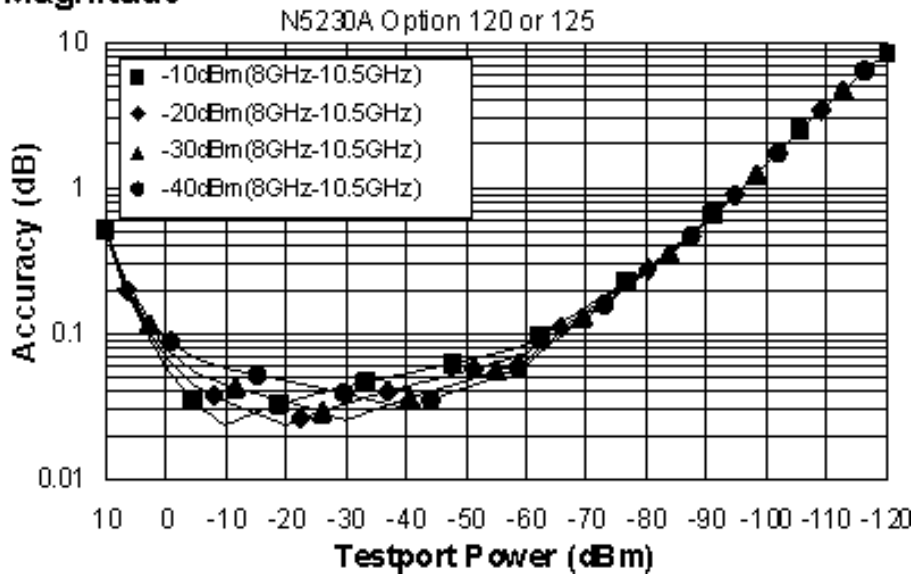


Phase

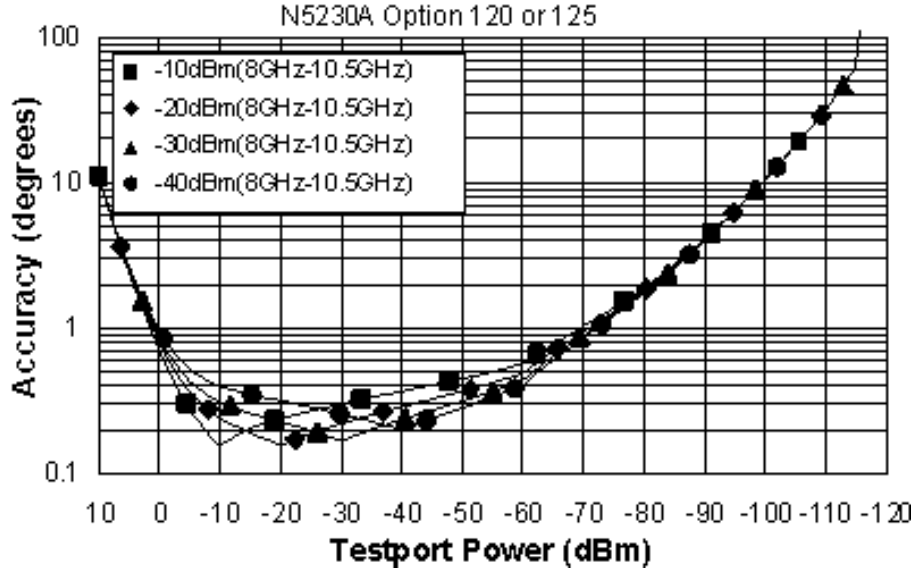


Dynamic Accuracy, 8 - 10.5 GHz, Option 120 or 125

Magnitude

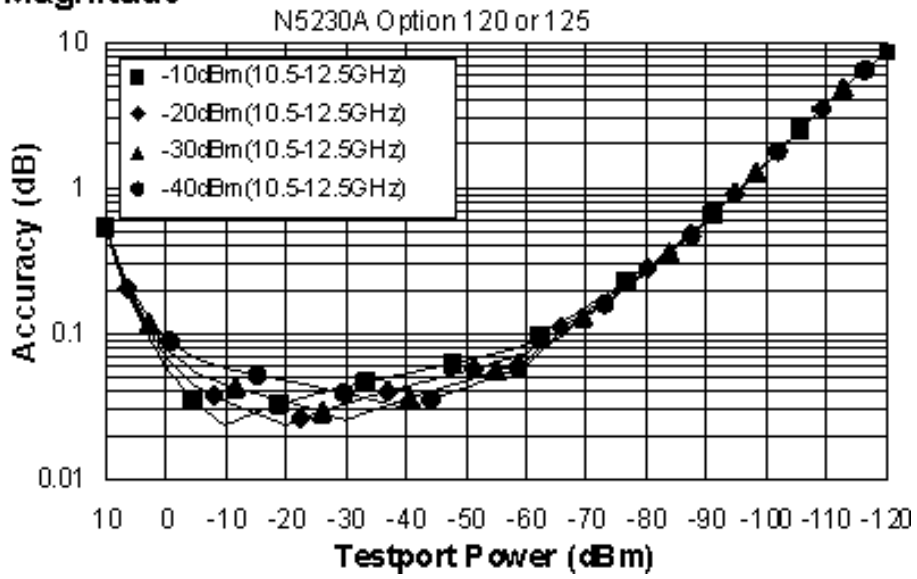


Phase

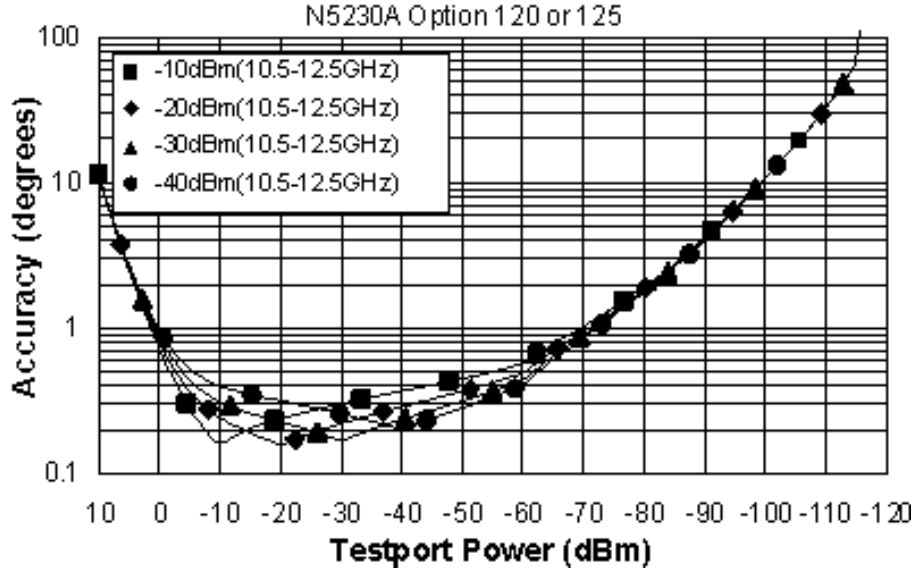


Dynamic Accuracy, 10.5 - 12.5 GHz, Option 120 or 125

Magnitude

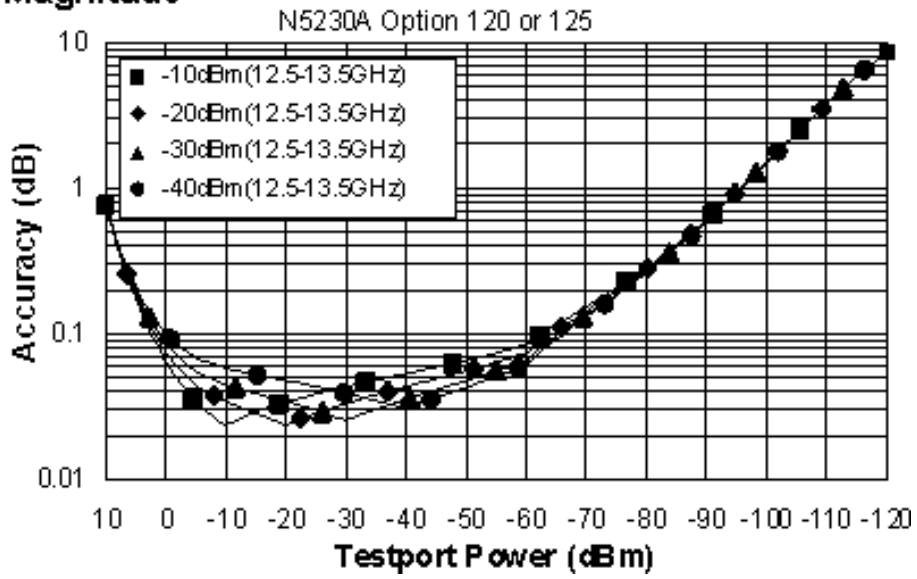


Phase

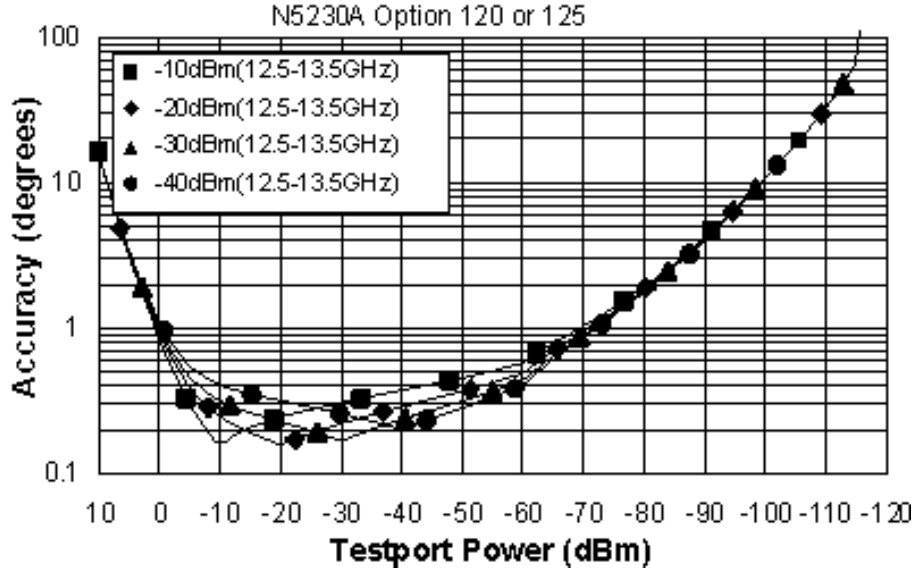


Dynamic Accuracy, 12.5 - 13.5 GHz, Option 120 or 125

Magnitude



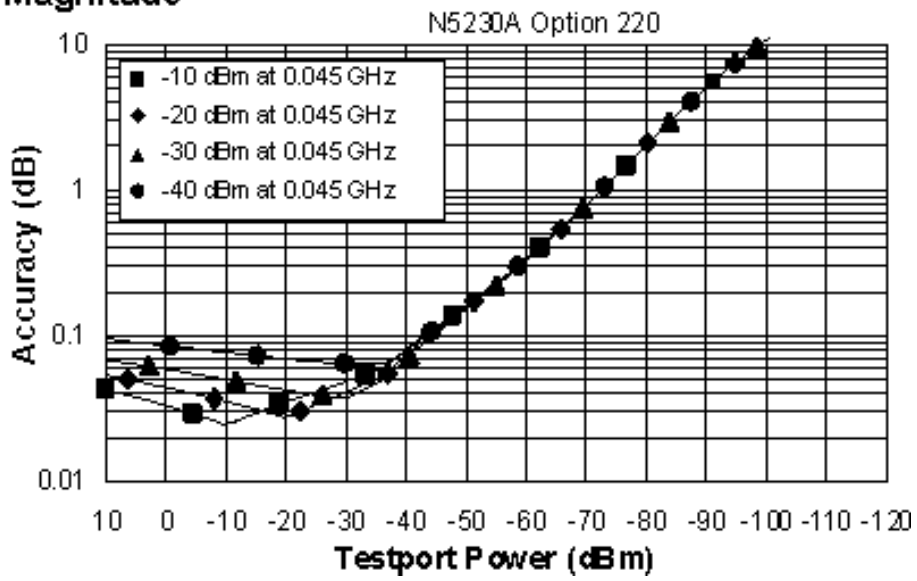
Phase



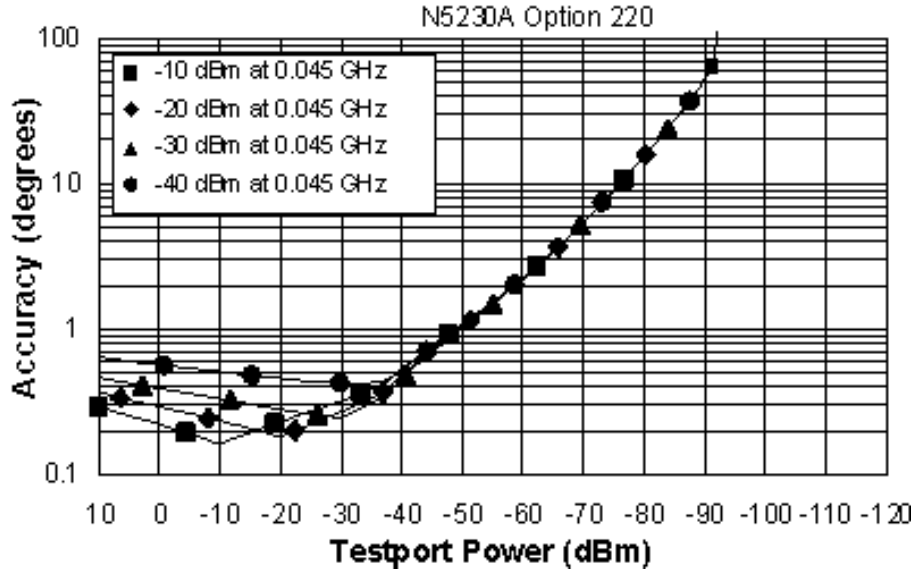
Options 220, 225

Dynamic Accuracy, 0.045 GHz, Option 220 or 225

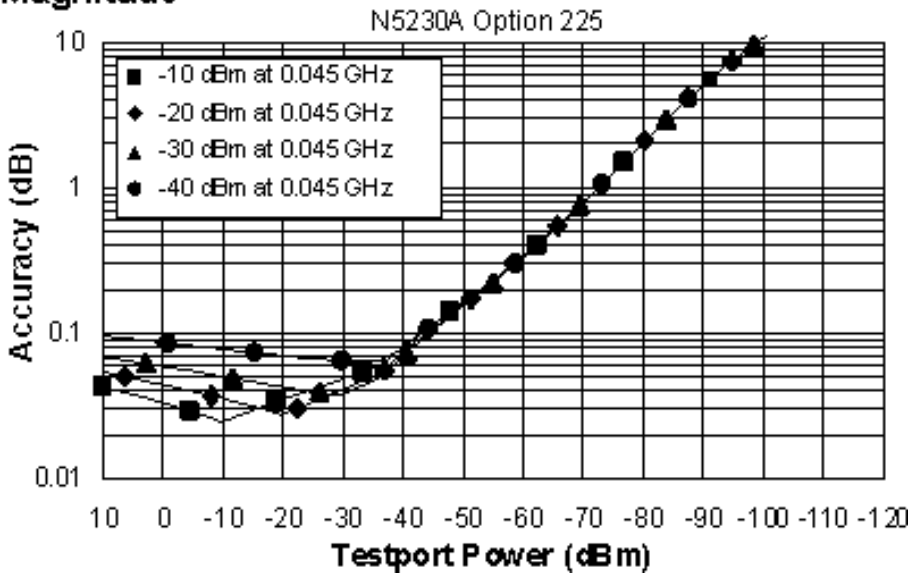
Magnitude



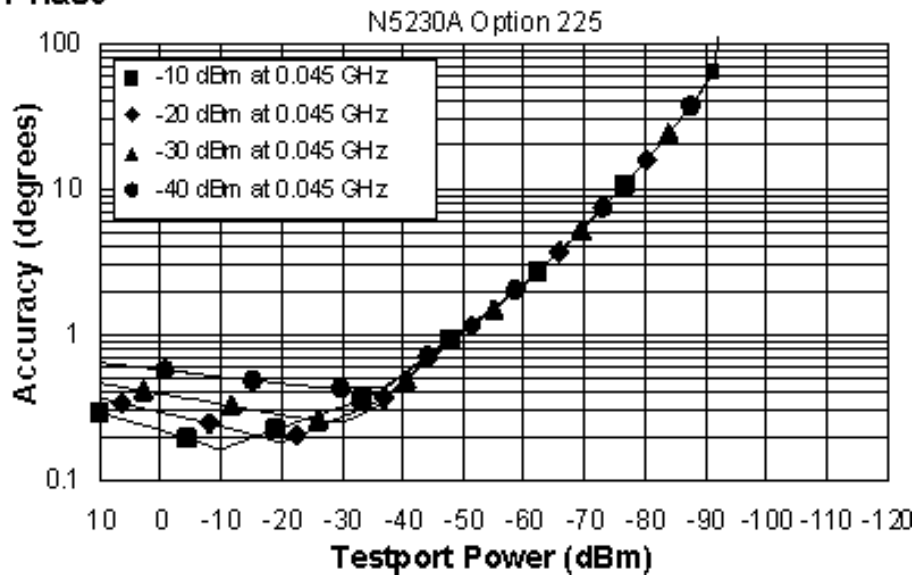
Phase



Magnitude

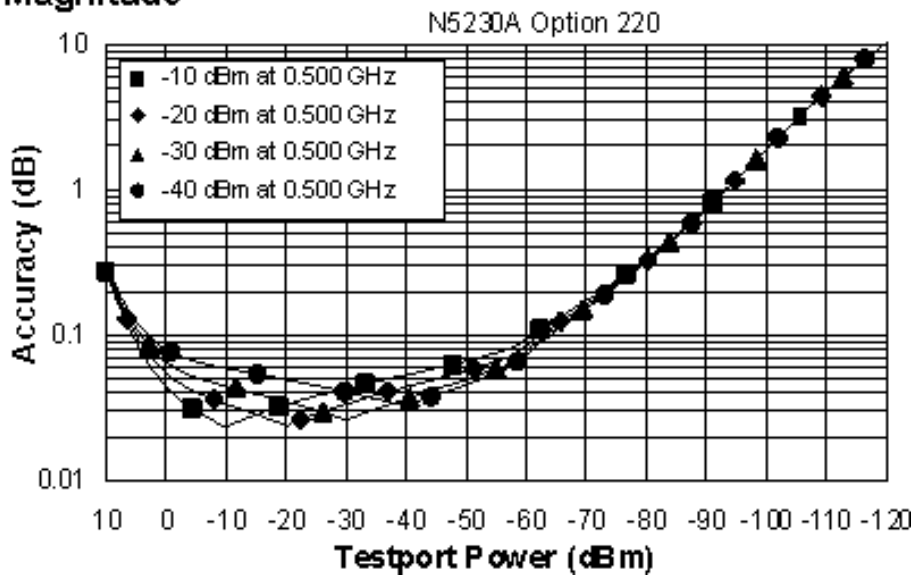


Phase

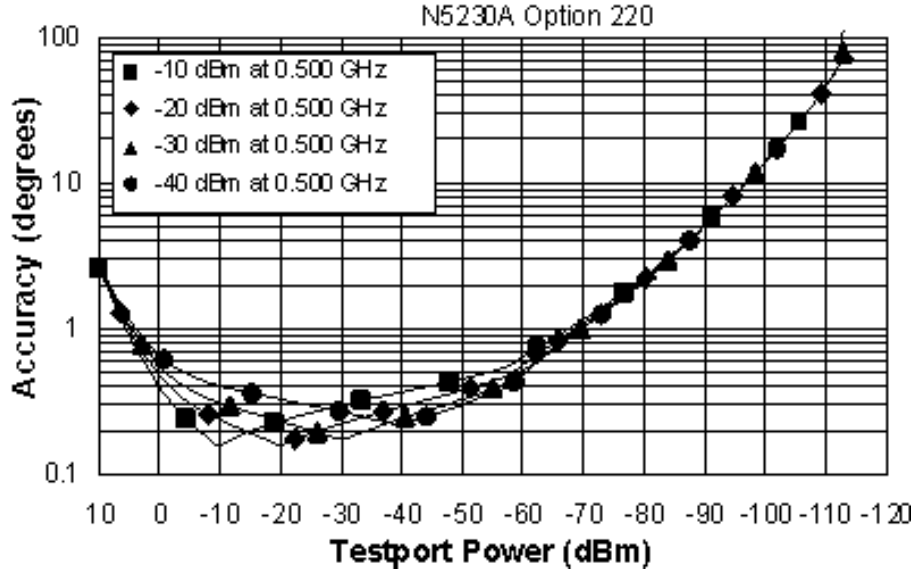


Dynamic Accuracy, 0.500 GHz, Option 220 or 225

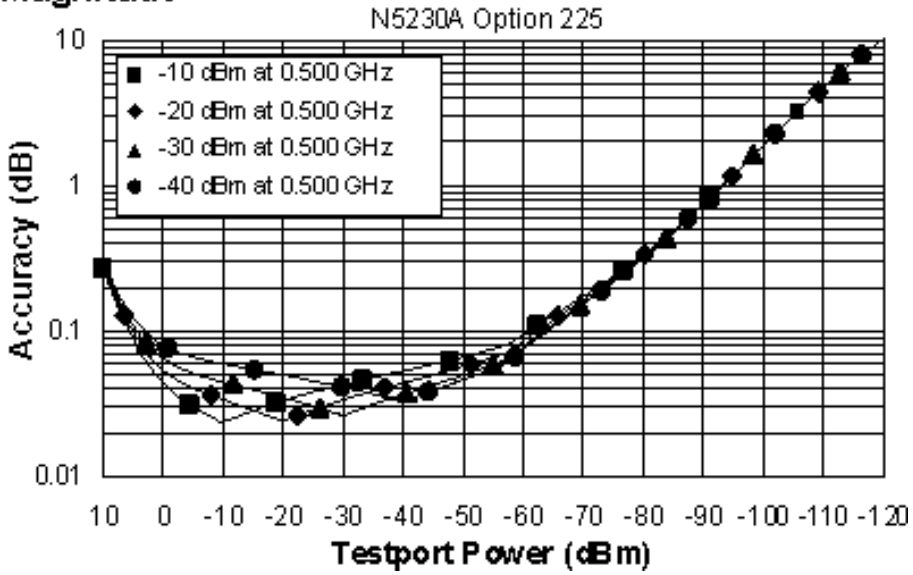
Magnitude



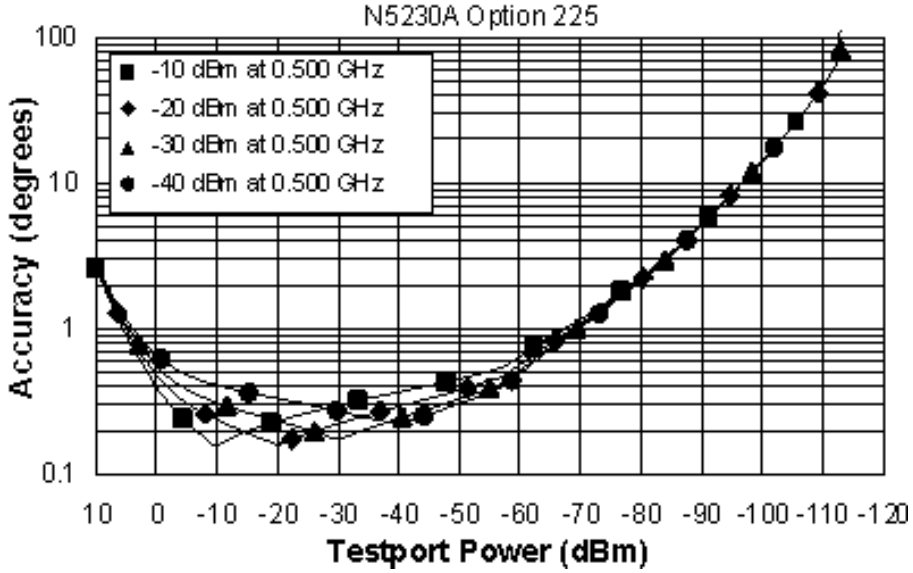
Phase



Magnitude

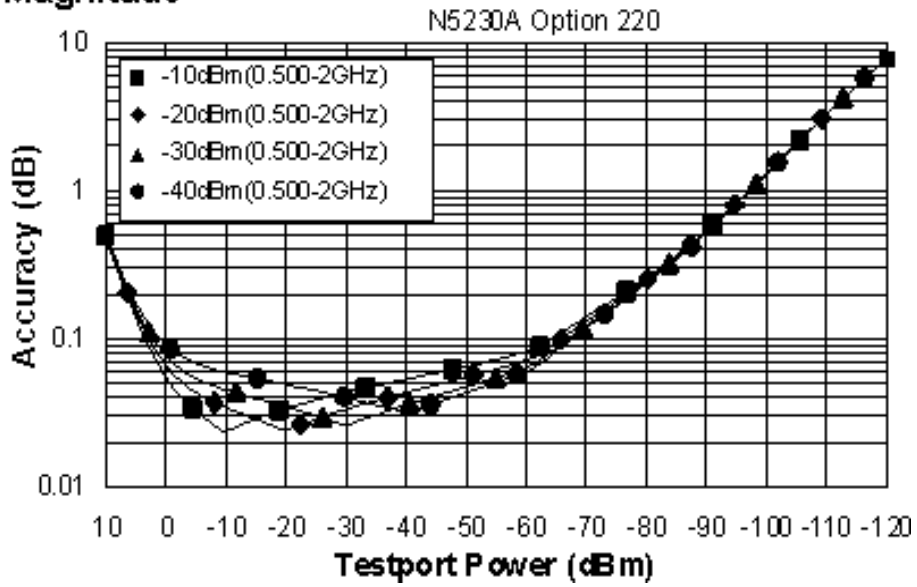


Phase

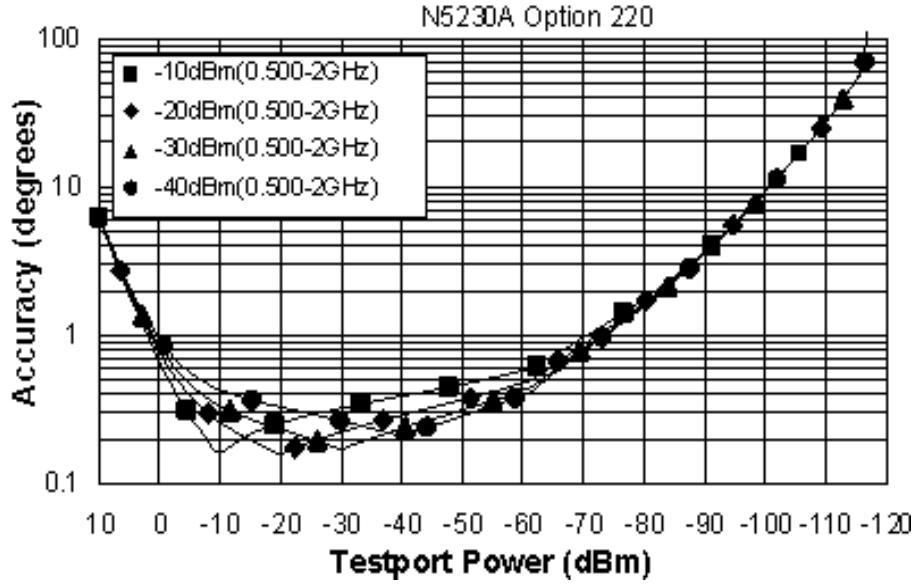


Dynamic Accuracy, 0.500 - 2 GHz, Option 220 or 225

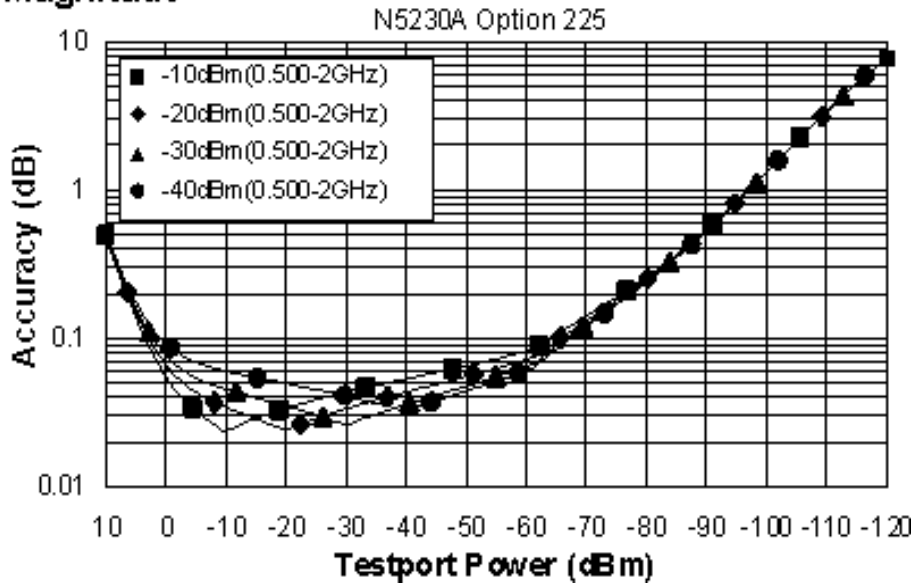
Magnitude



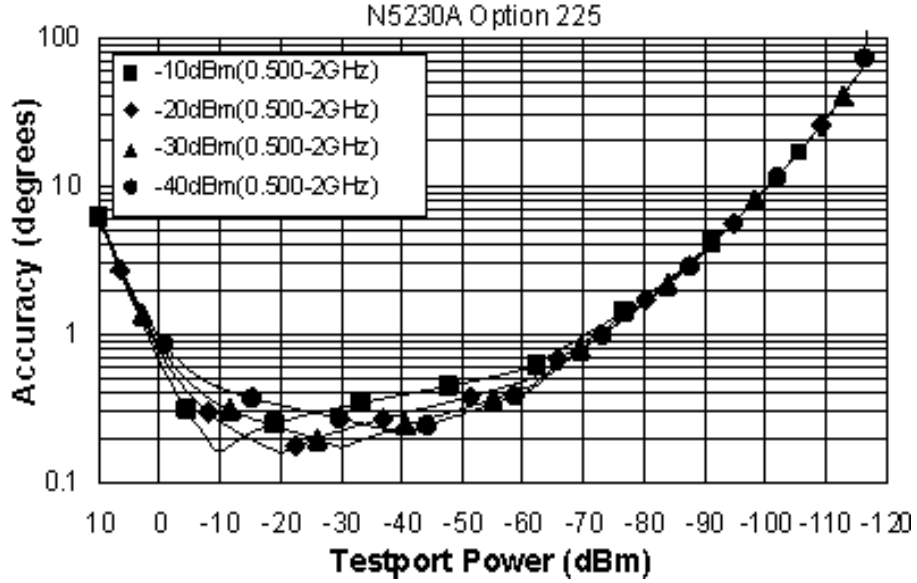
Phase



Magnitude

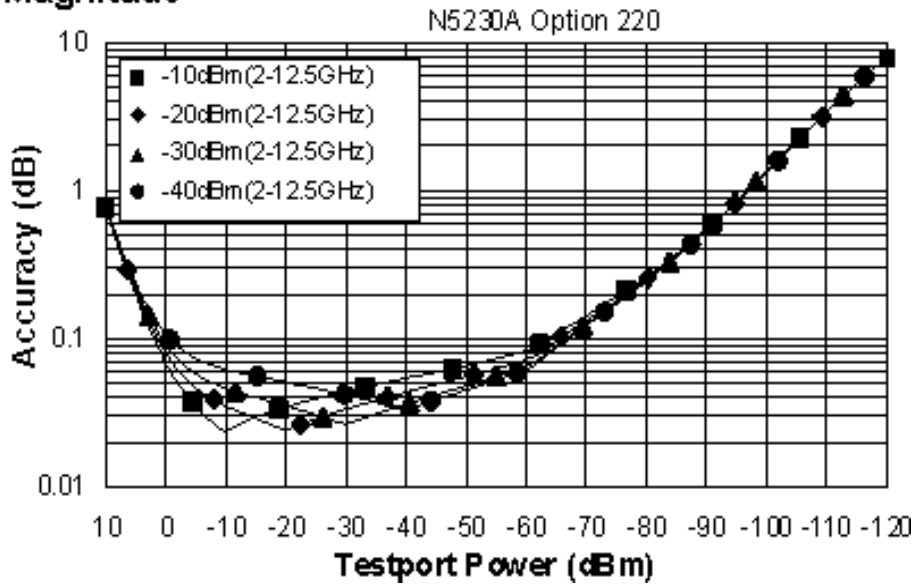


Phase

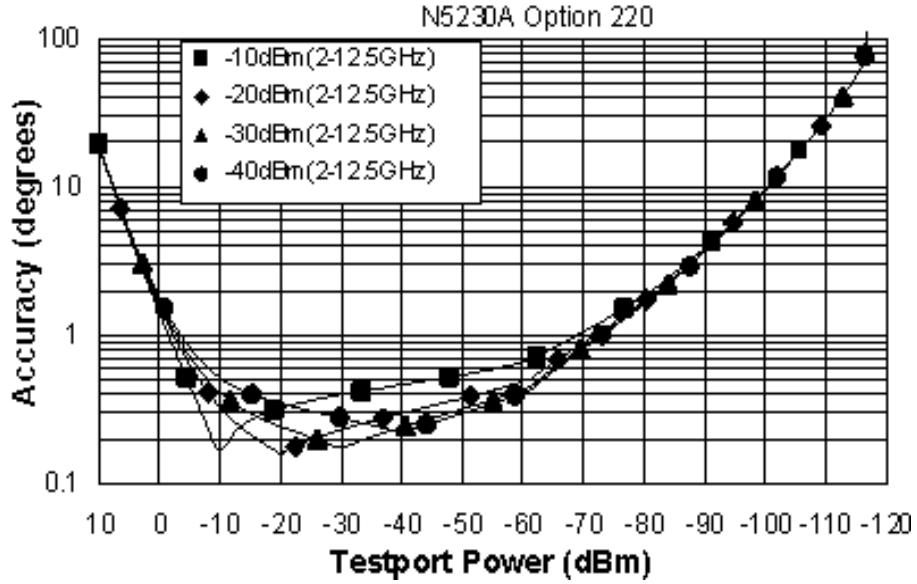


Dynamic Accuracy, 2 - 12.5 GHz, Option 220 or 225

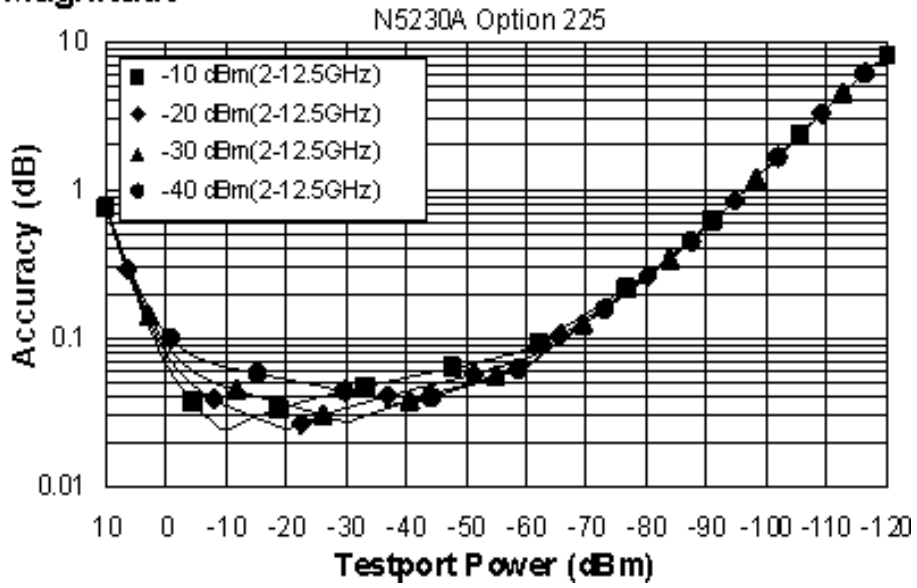
Magnitude



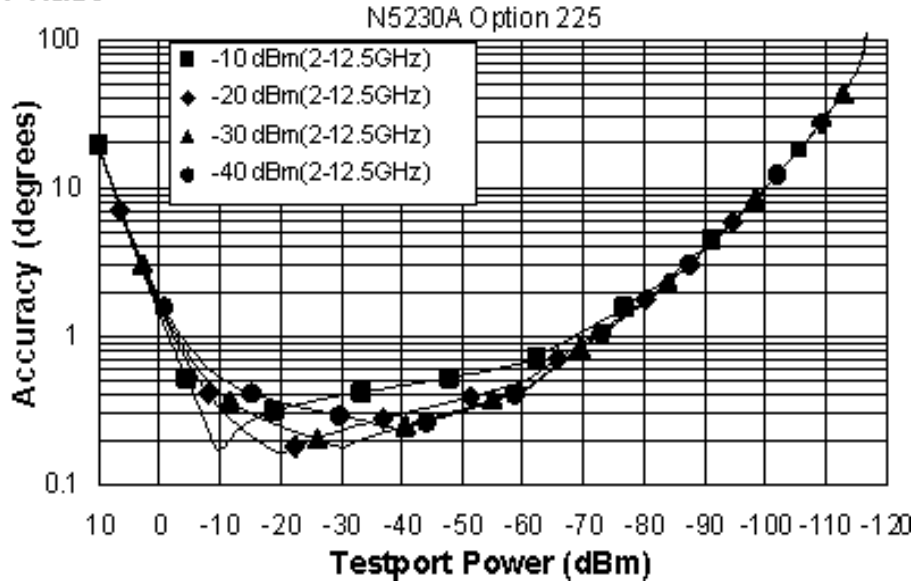
Phase



Magnitude

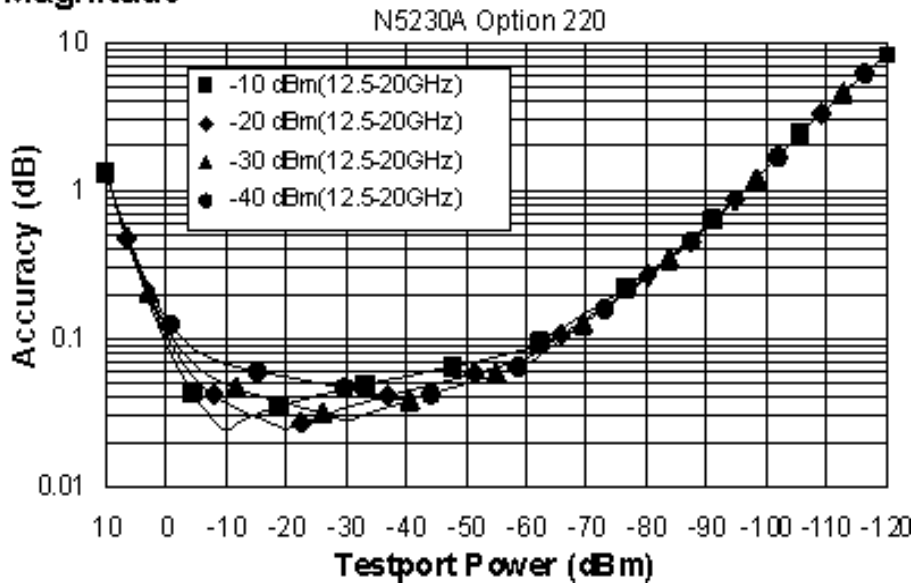


Phase

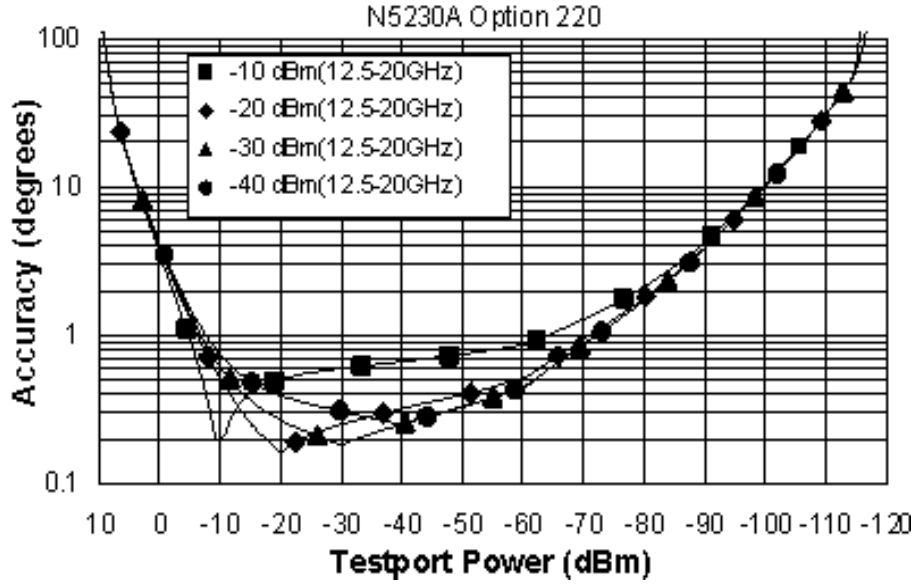


Dynamic Accuracy, 12.5 - 20 GHz, Option 220 or 225

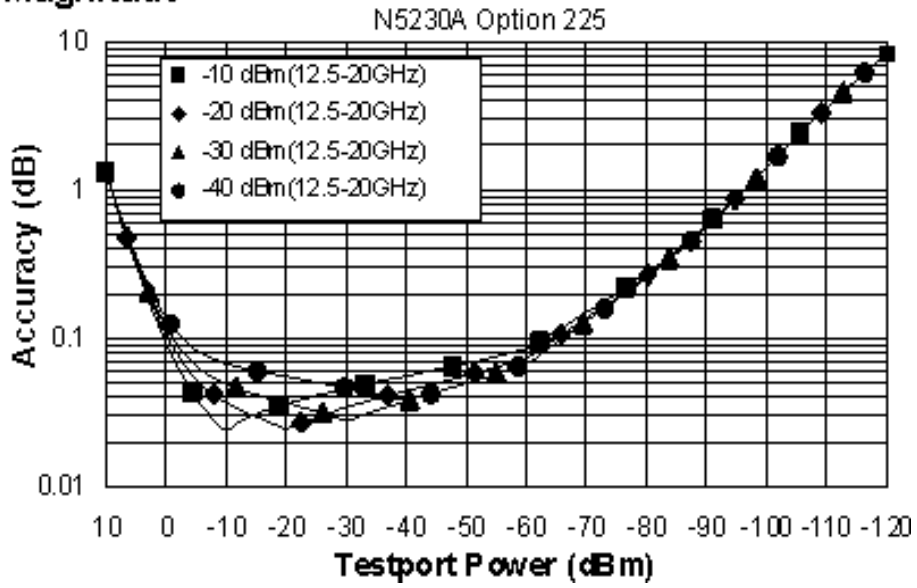
Magnitude



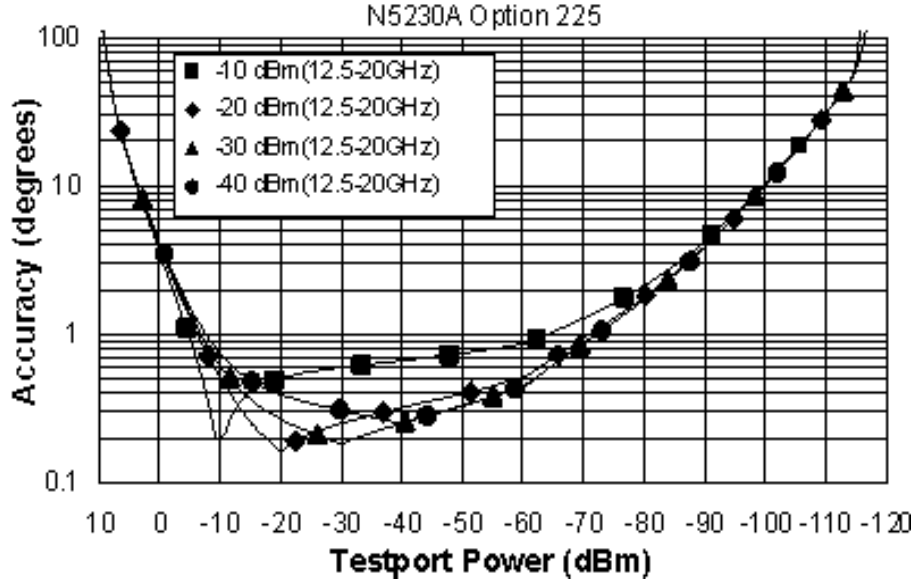
Phase



Magnitude



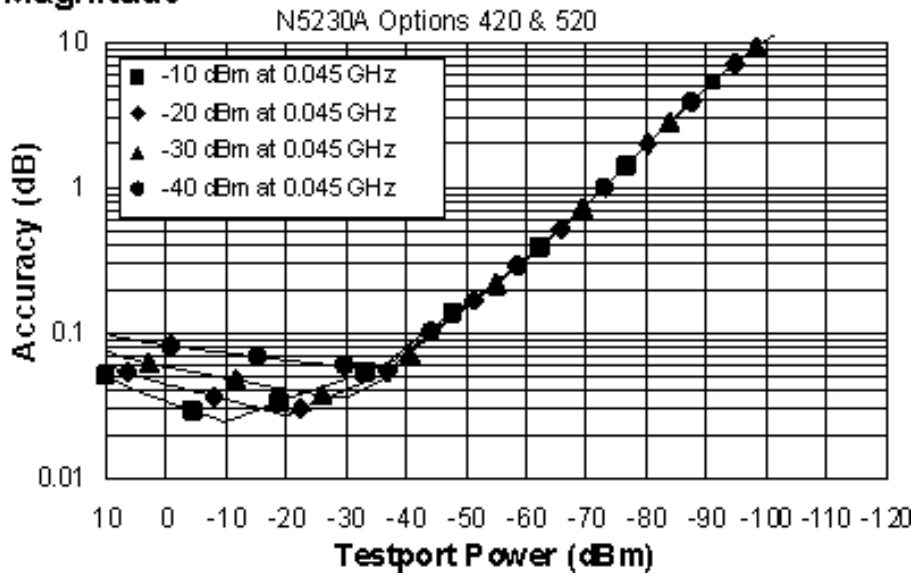
Phase



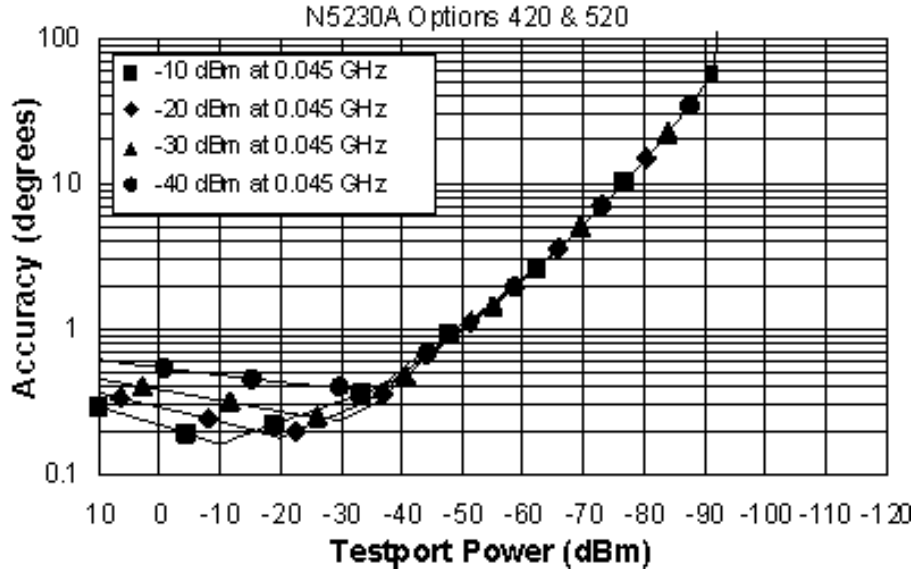
Options 420, 425, 520, 525

Dynamic Accuracy, 0.045 GHz, Option 420, 425, 520, or 525

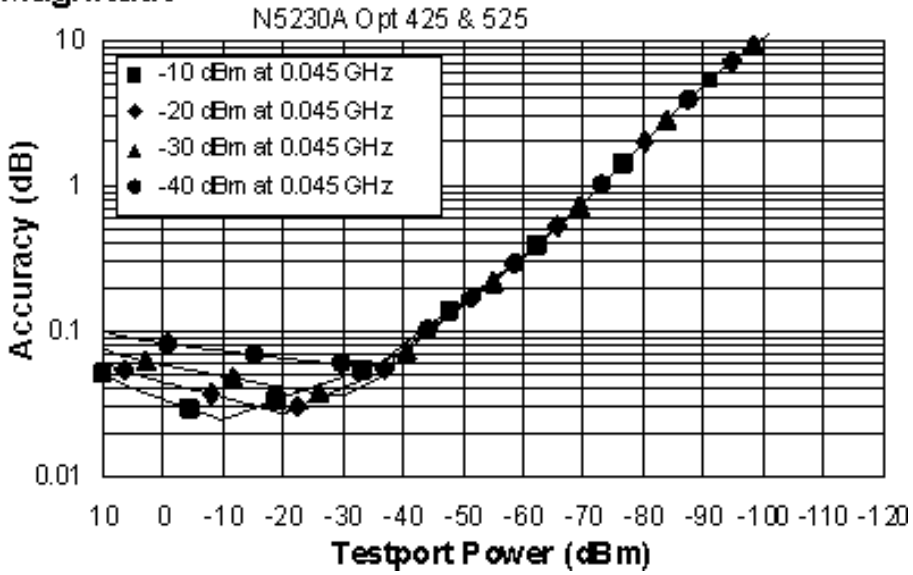
Magnitude



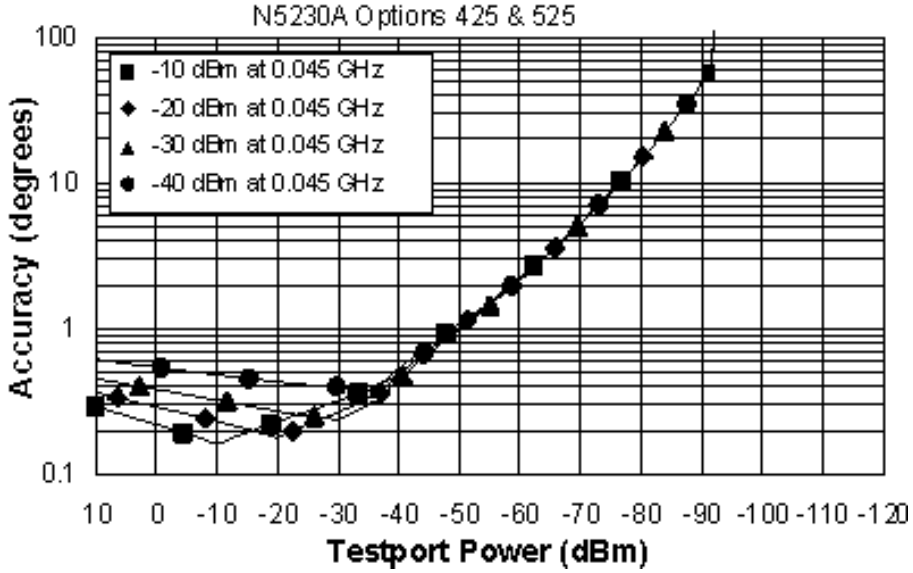
Phase



Magnitude

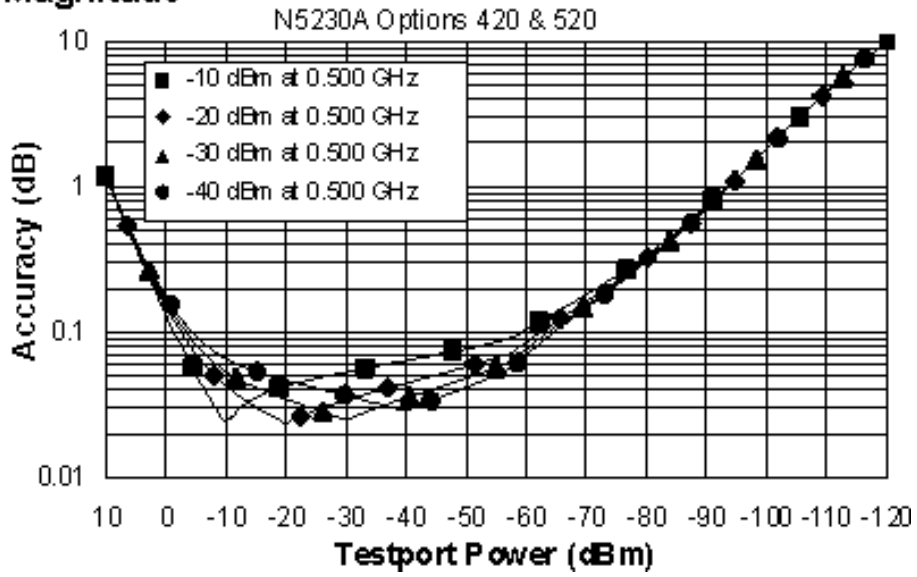


Phase

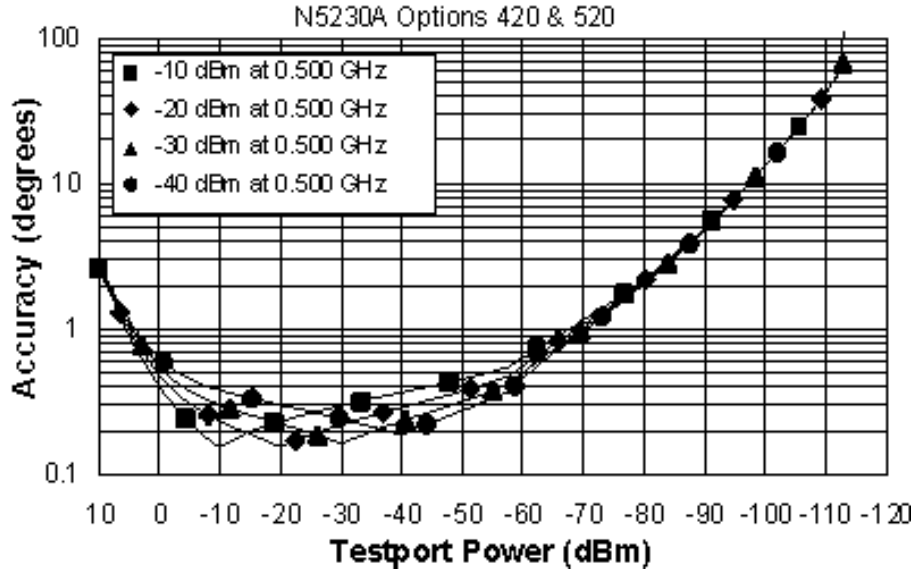


Dynamic Accuracy, 0.500 GHz, Option 420, 425, 520, or 525

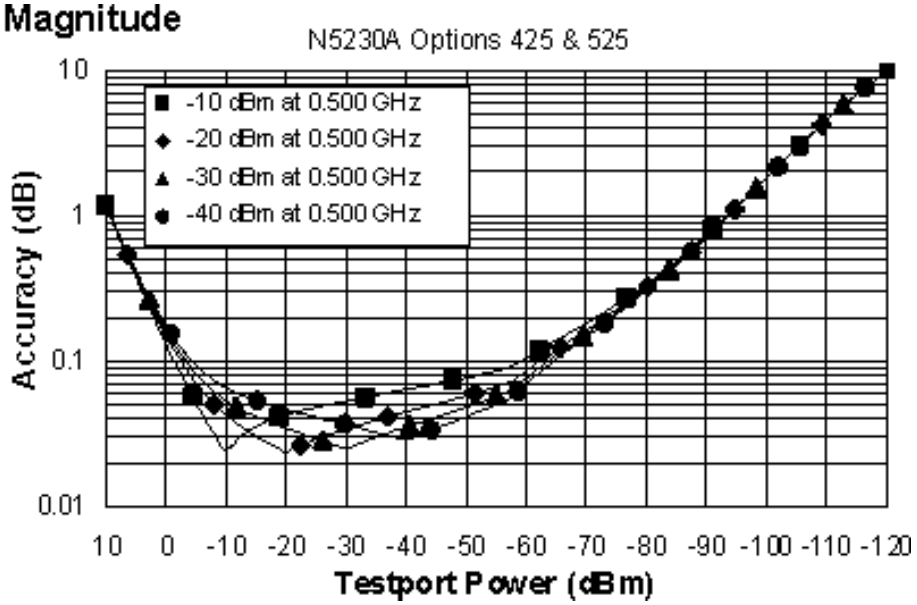
Magnitude



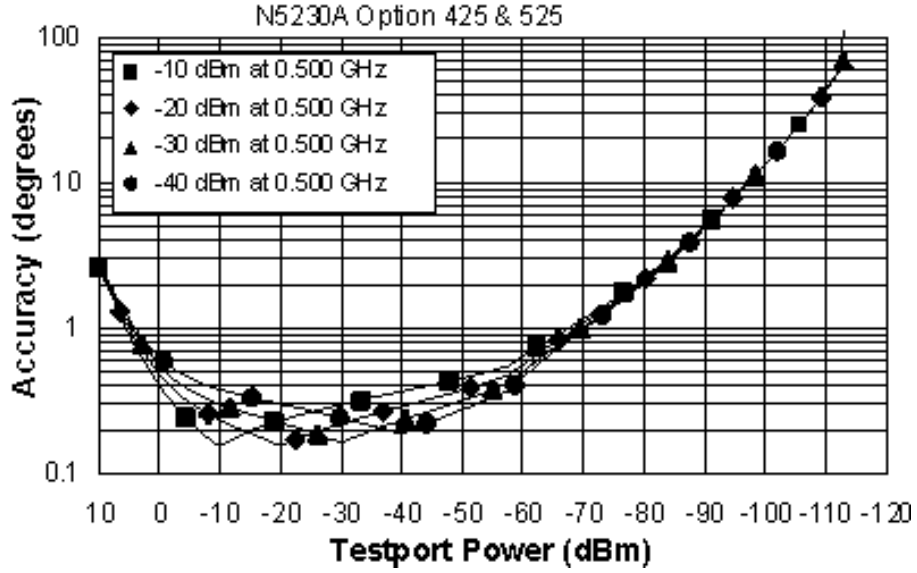
Phase



Magnitude

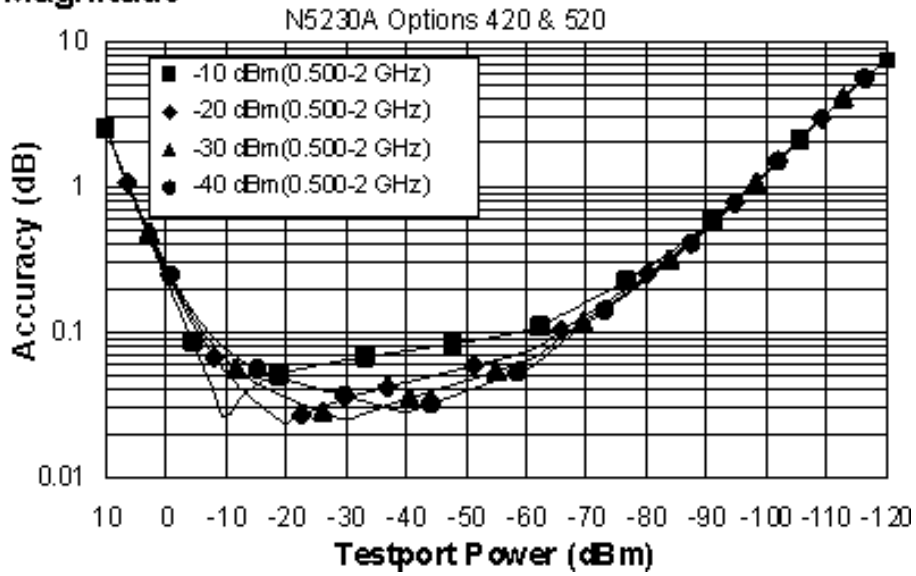


Phase

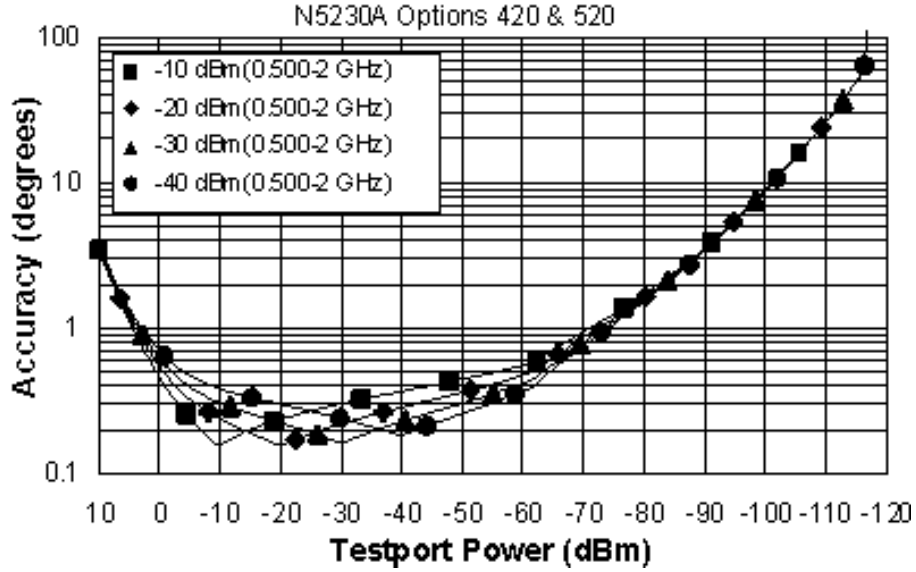


Dynamic Accuracy, 0.500 - 2 GHz, Option 420, 425, 520, or 525

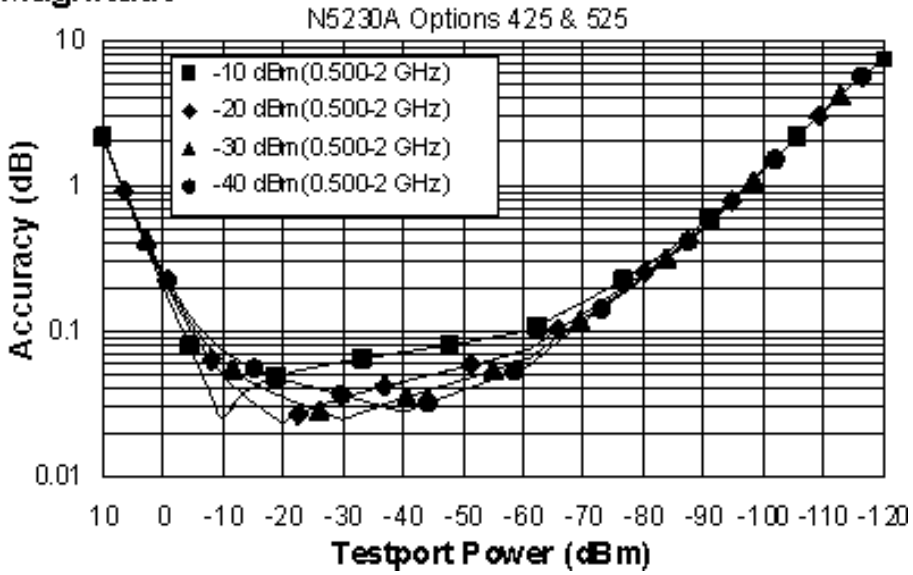
Magnitude



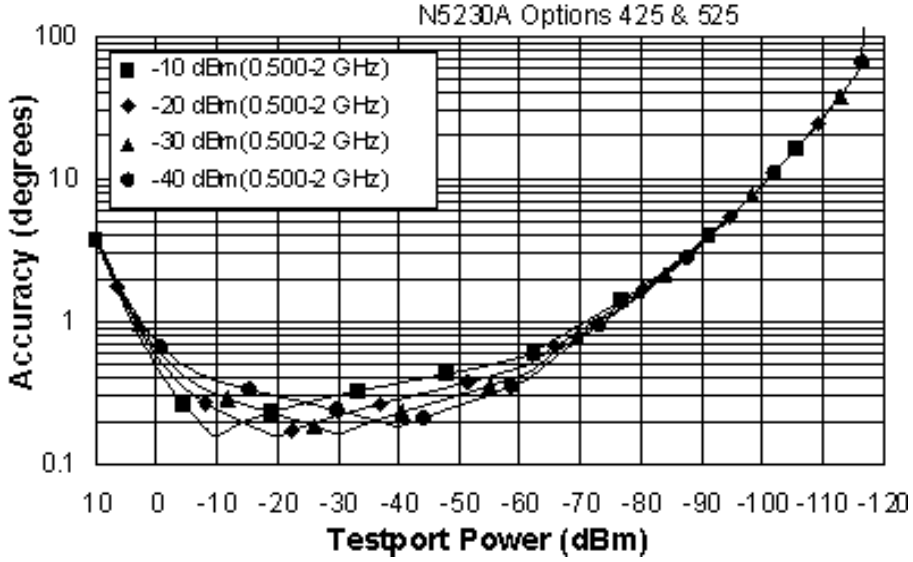
Phase



Magnitude

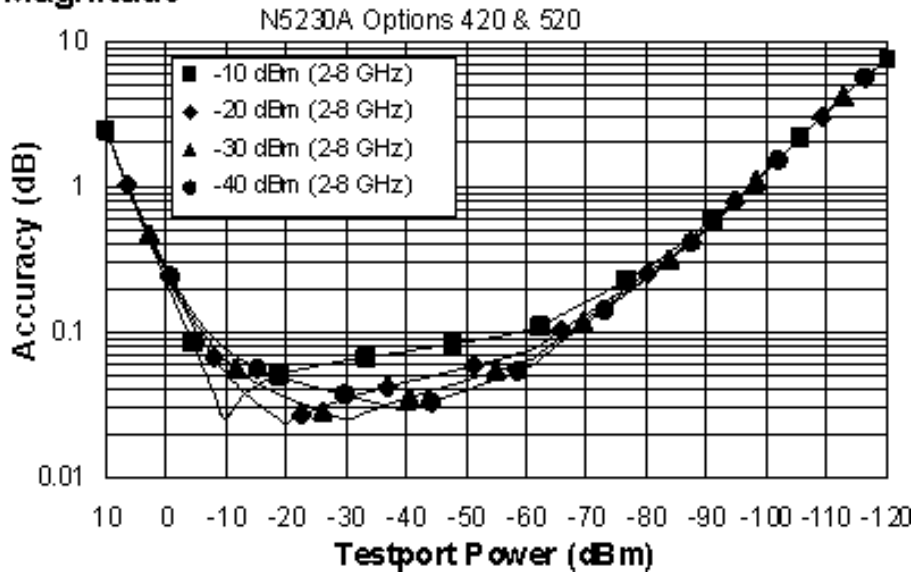


Phase

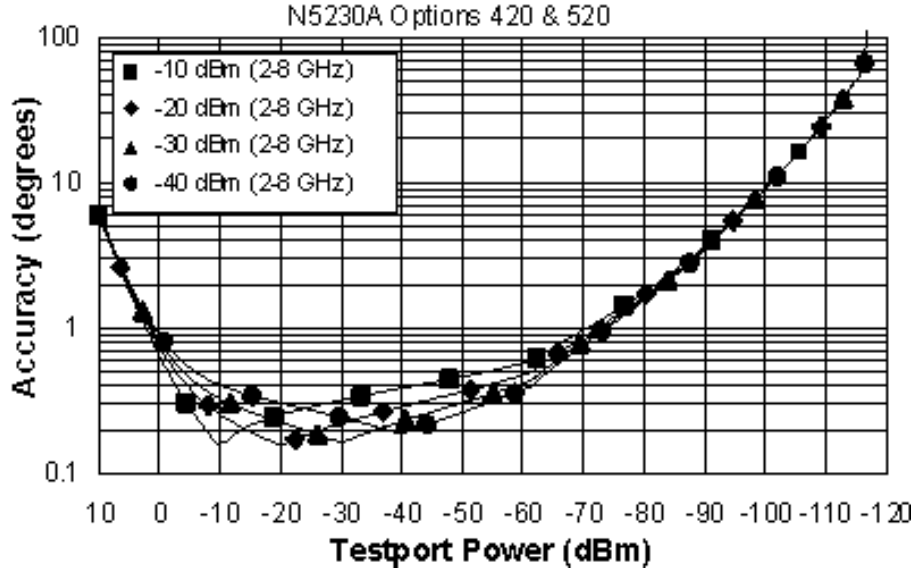


Dynamic Accuracy, 2 - 8 GHz, Option 420, 425, 520, or 525

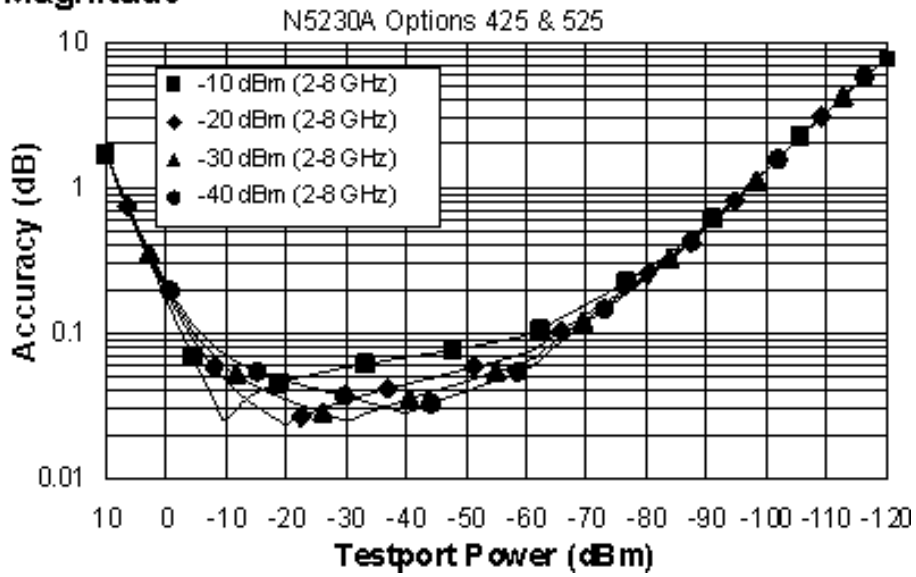
Magnitude



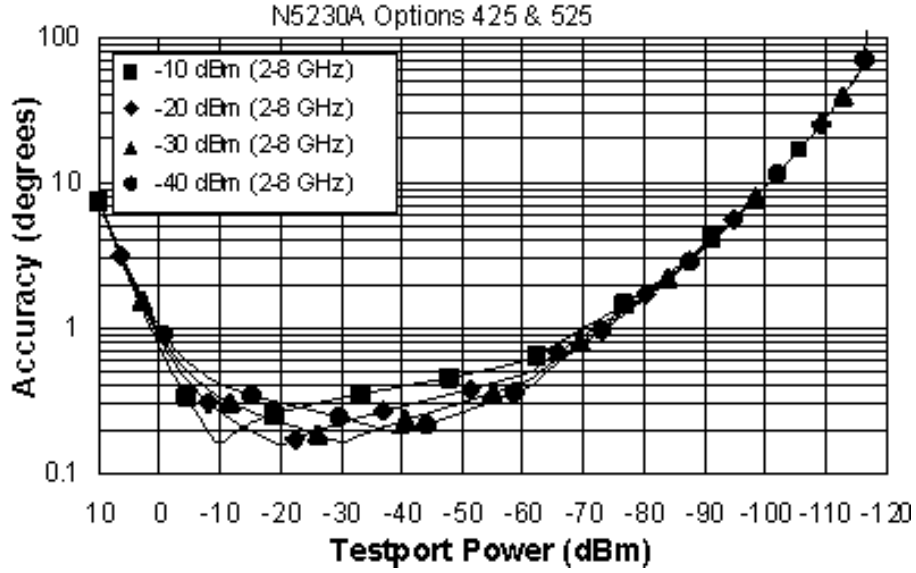
Phase



Magnitude

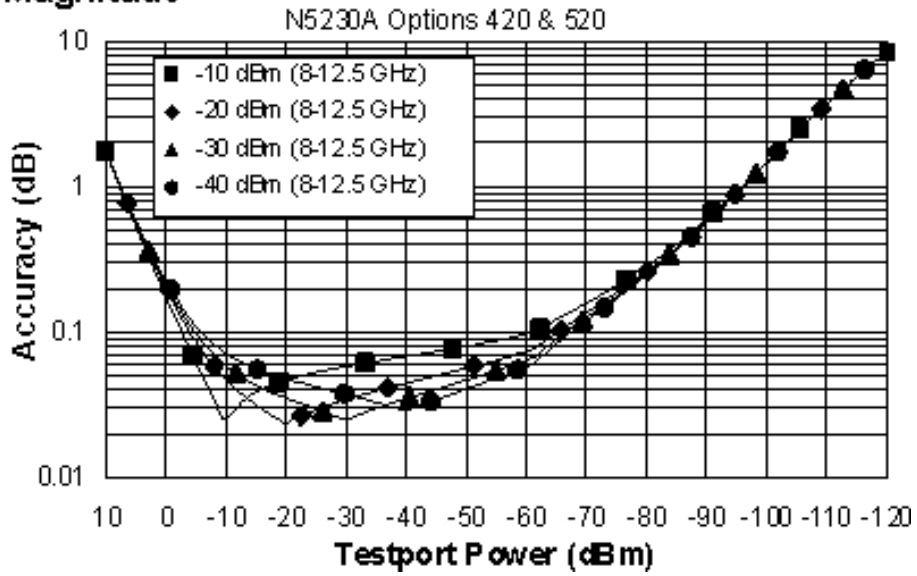


Phase

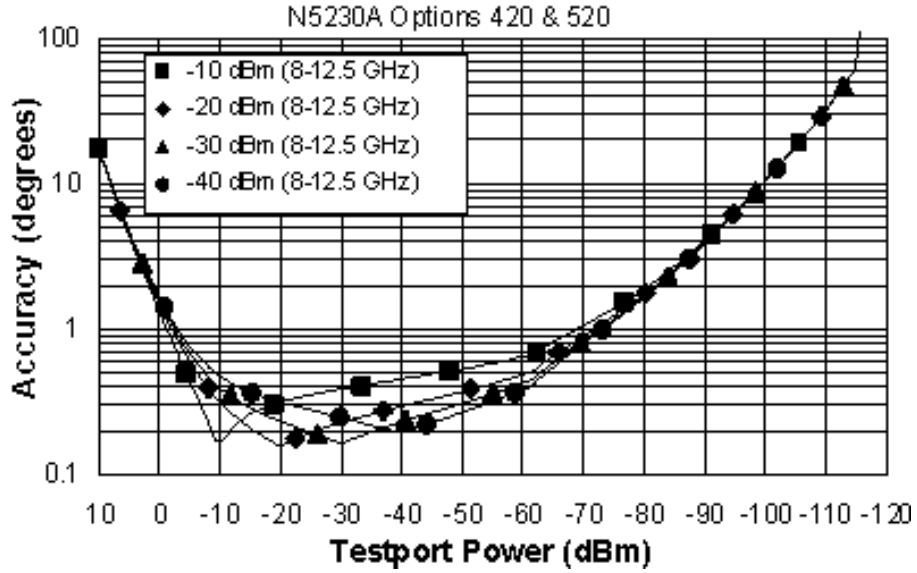


Dynamic Accuracy, 8 - 12.5 GHz, Option 420, 425, 520, or 525

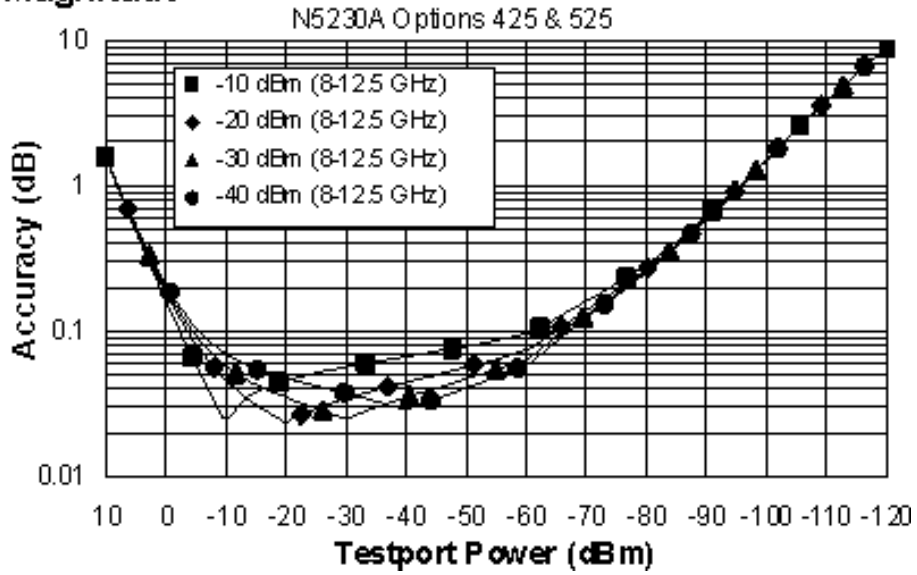
Magnitude



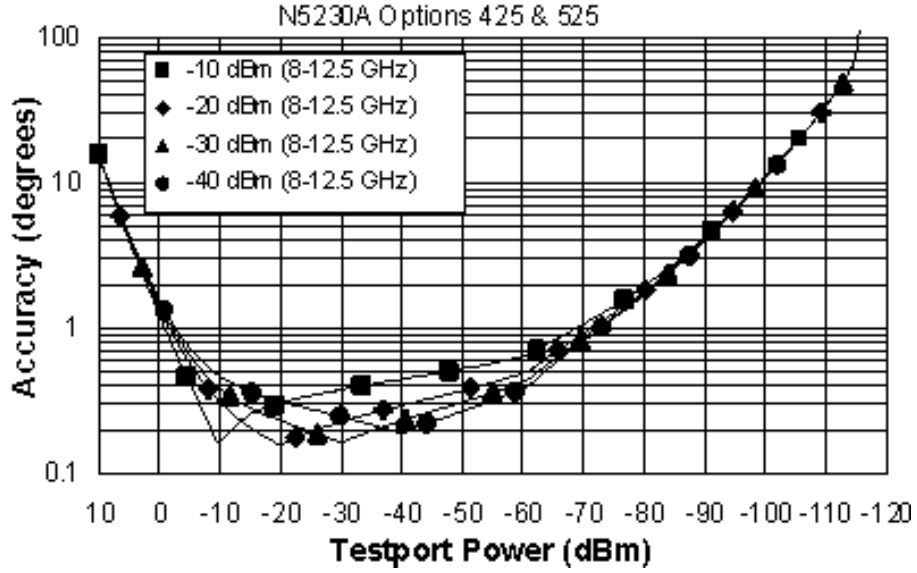
Phase



Magnitude

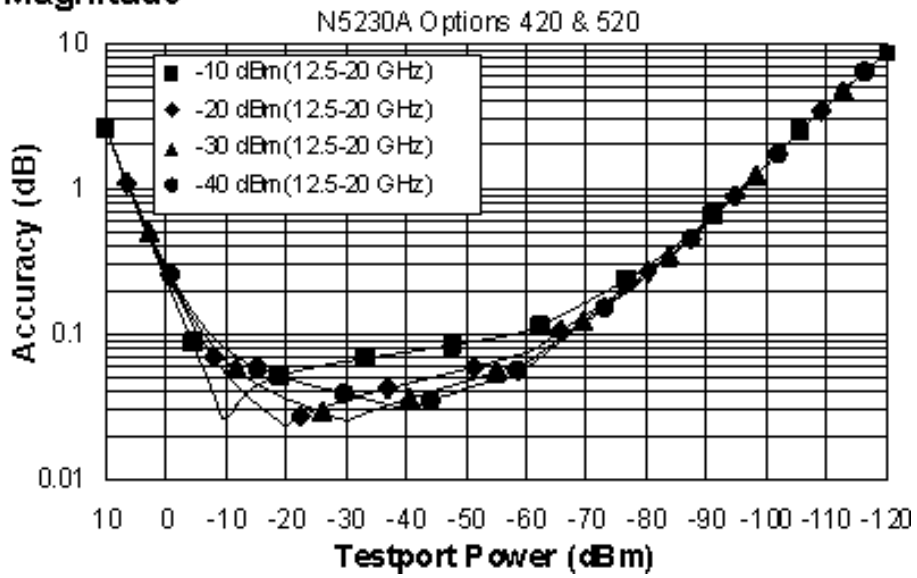


Phase

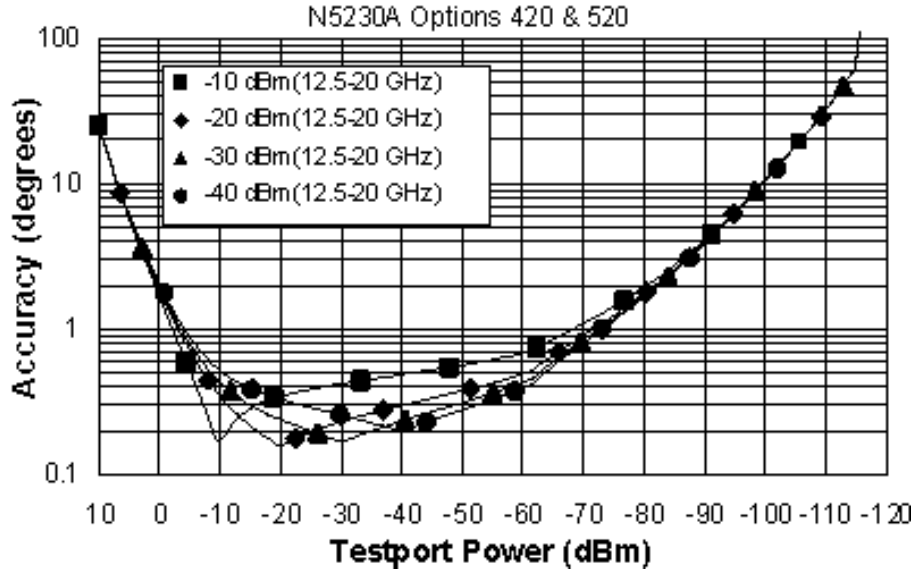


Dynamic Accuracy, 12.5 - 20 GHz, Option 420, 425, 520, or 525

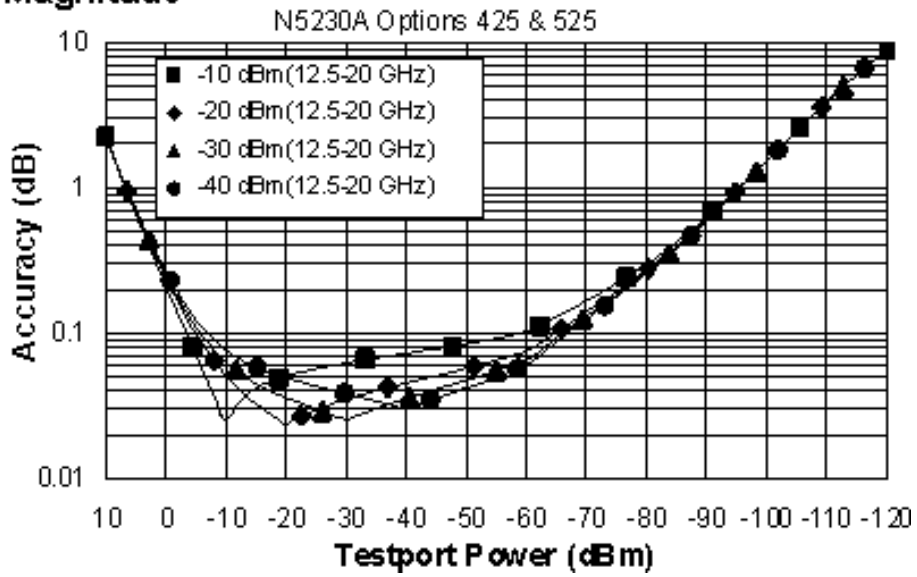
Magnitude



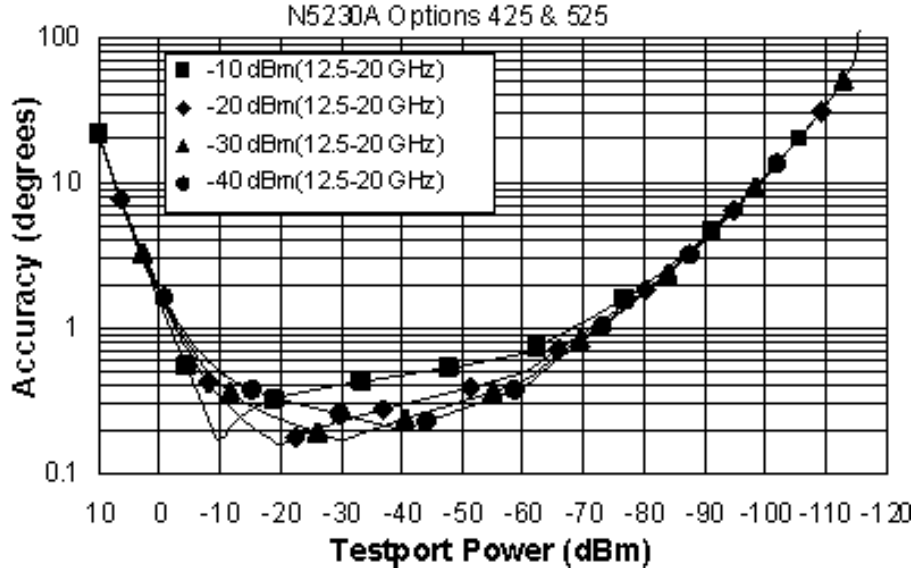
Phase



Magnitude

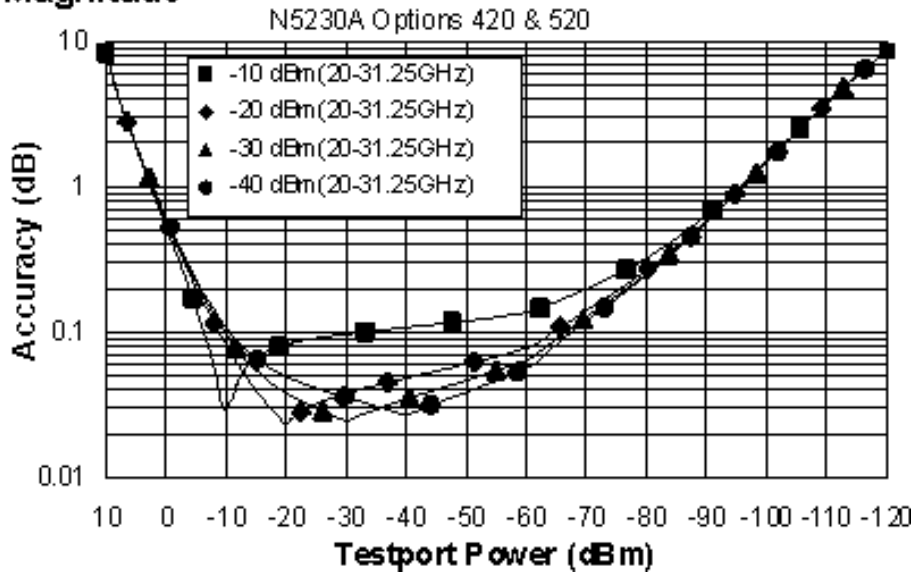


Phase

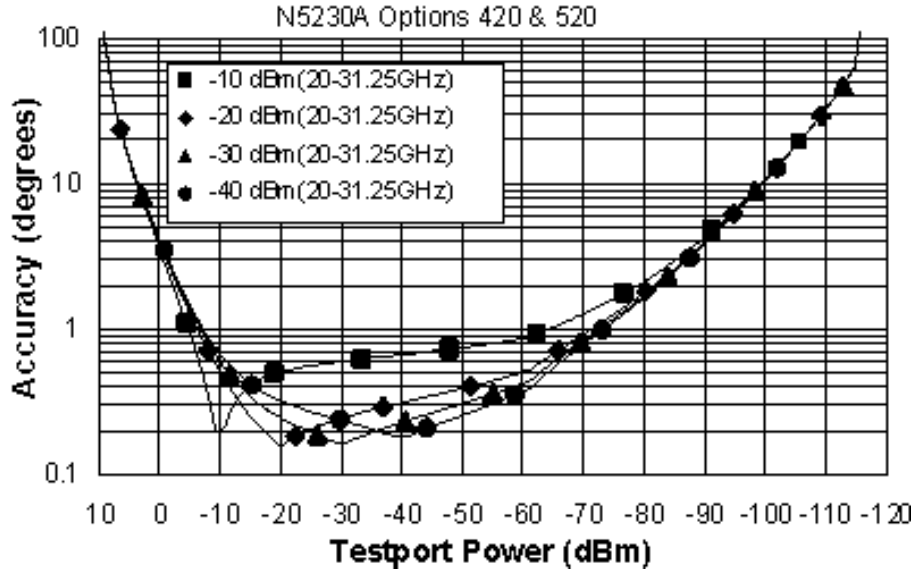


Dynamic Accuracy, 20 - 31.25 GHz, Option 420, 425, 520, or 525

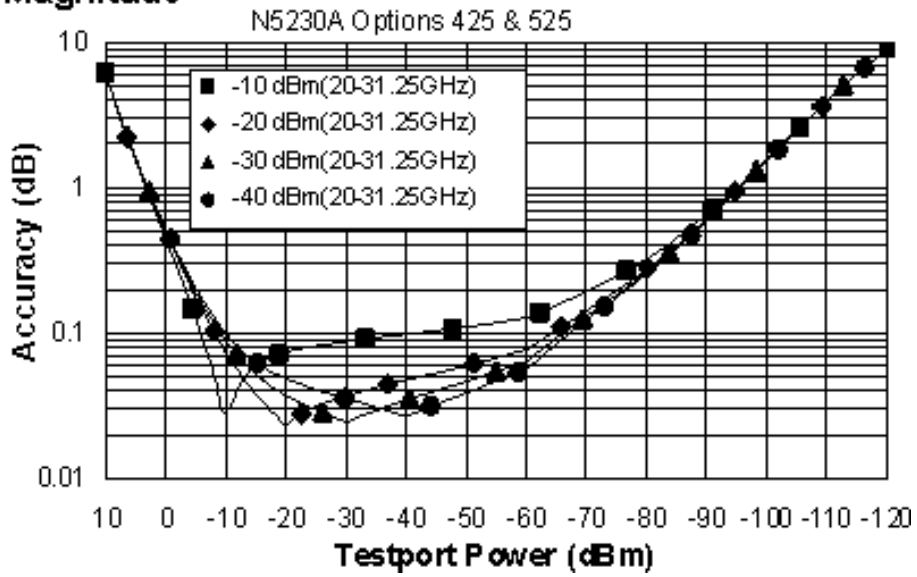
Magnitude



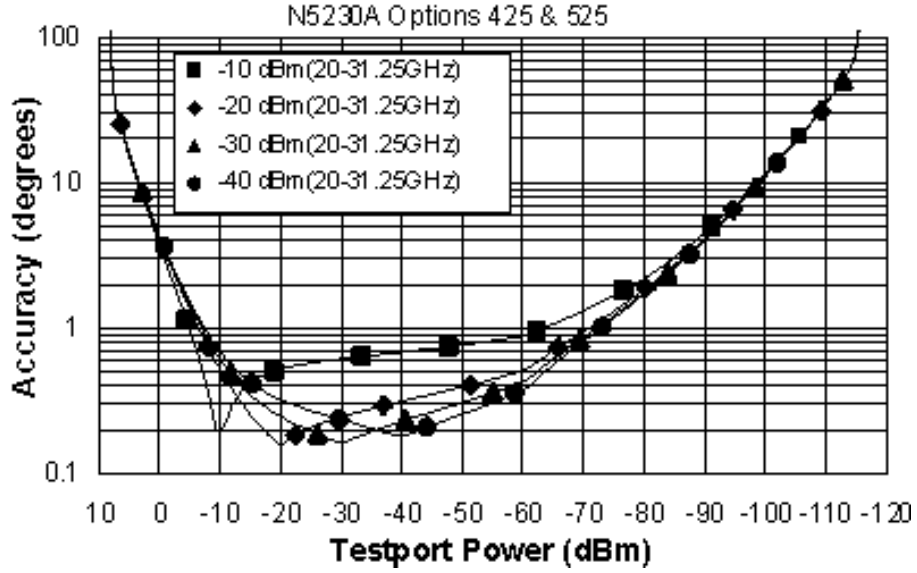
Phase



Magnitude

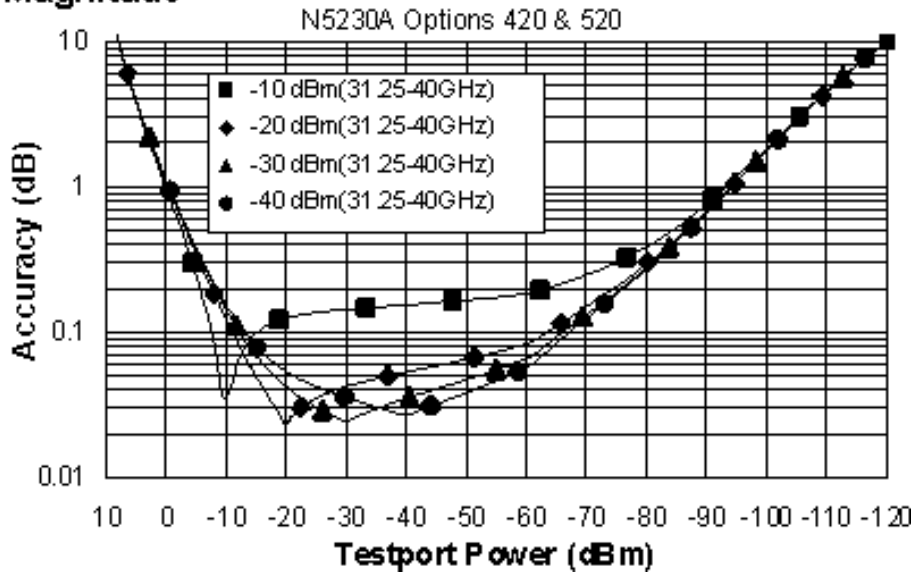


Phase

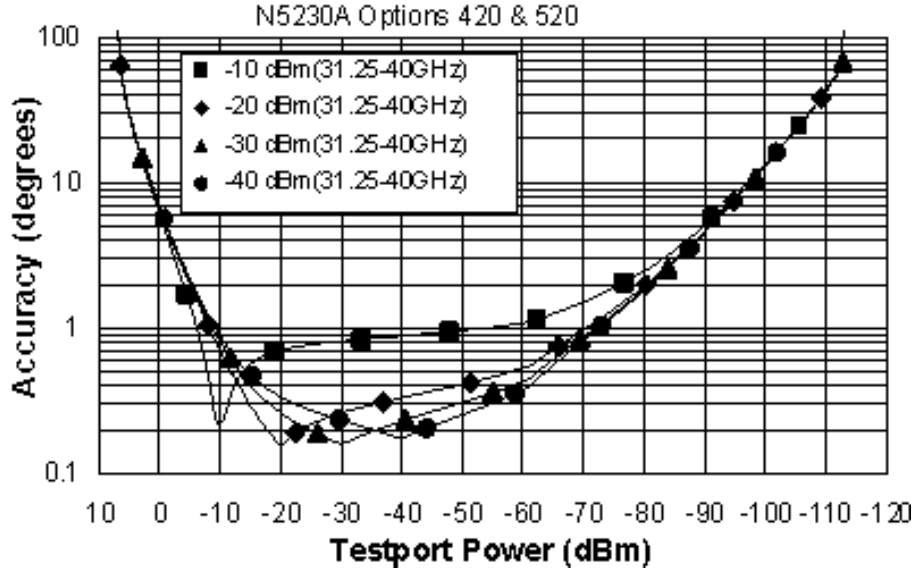


Dynamic Accuracy, 31.25 - 40 GHz, Option 420, 425, 520, or 525

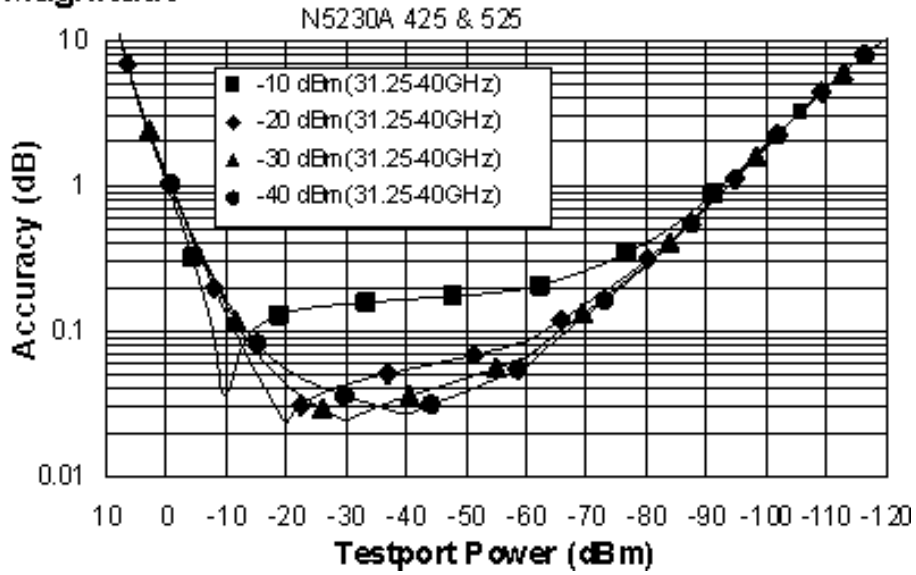
Magnitude



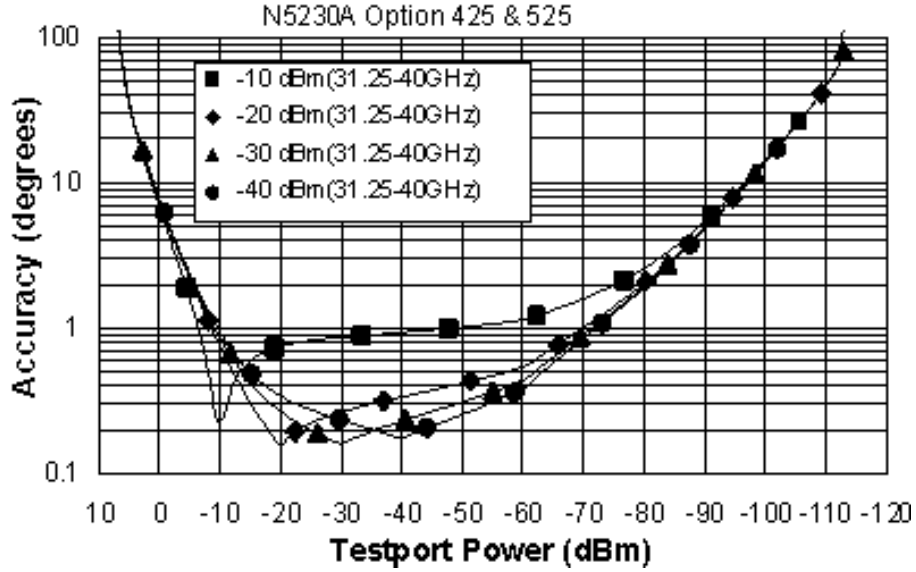
Phase



Magnitude

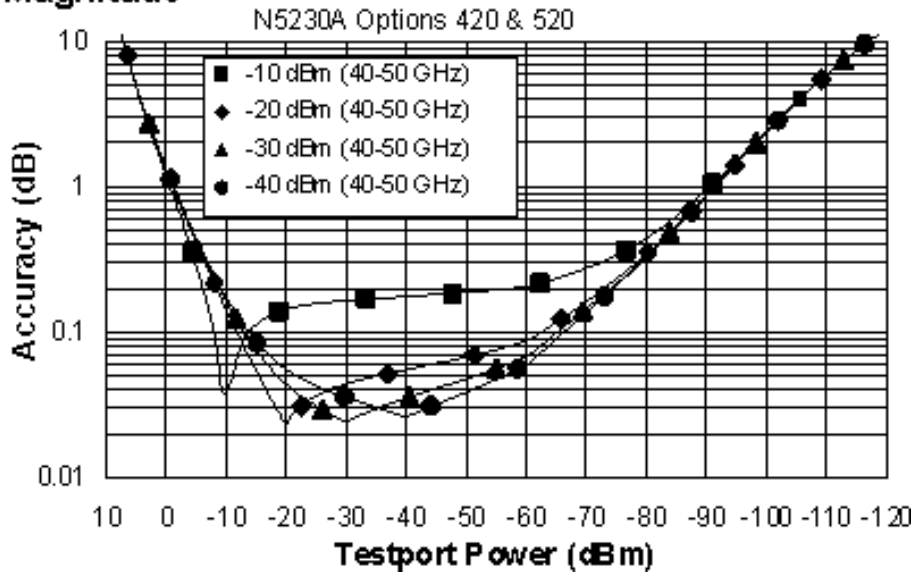


Phase

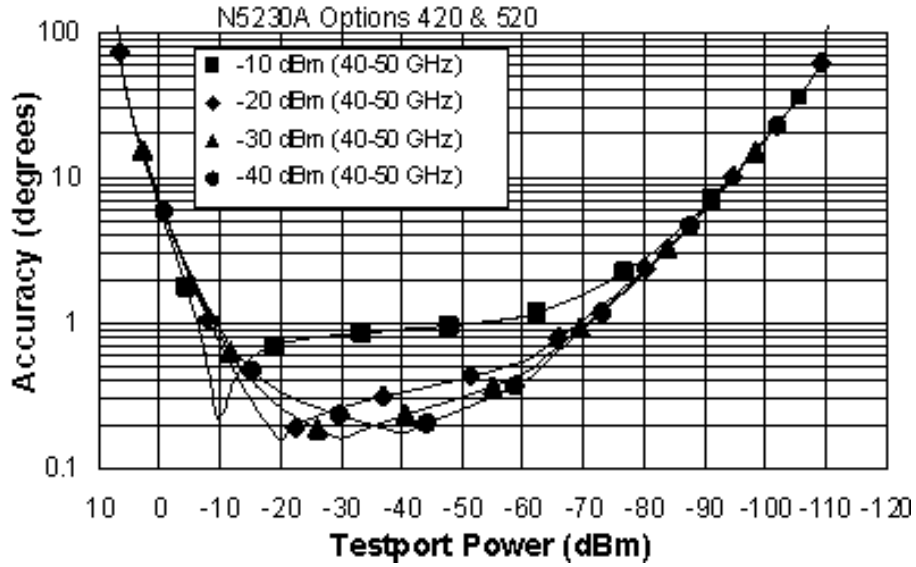


Dynamic Accuracy, 40 - 50 GHz, Option 520 or 525

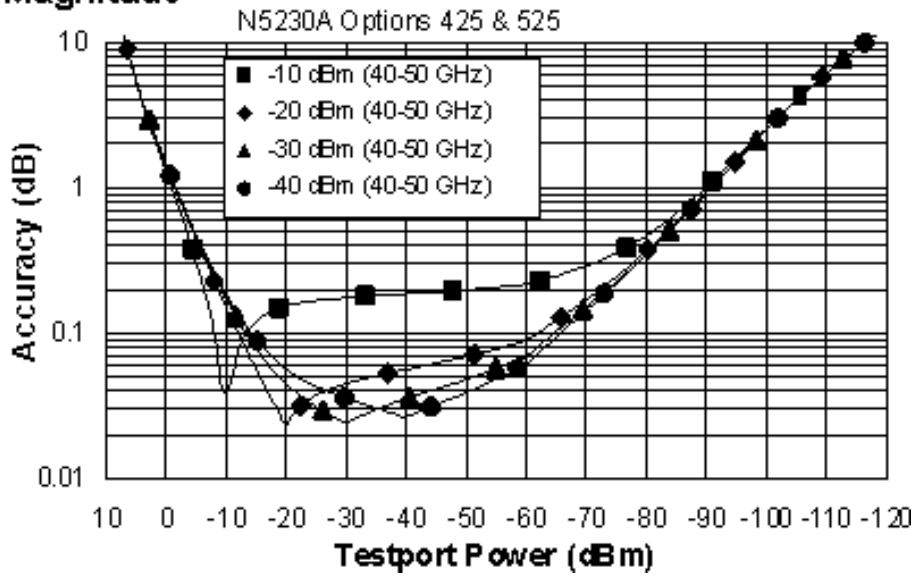
Magnitude



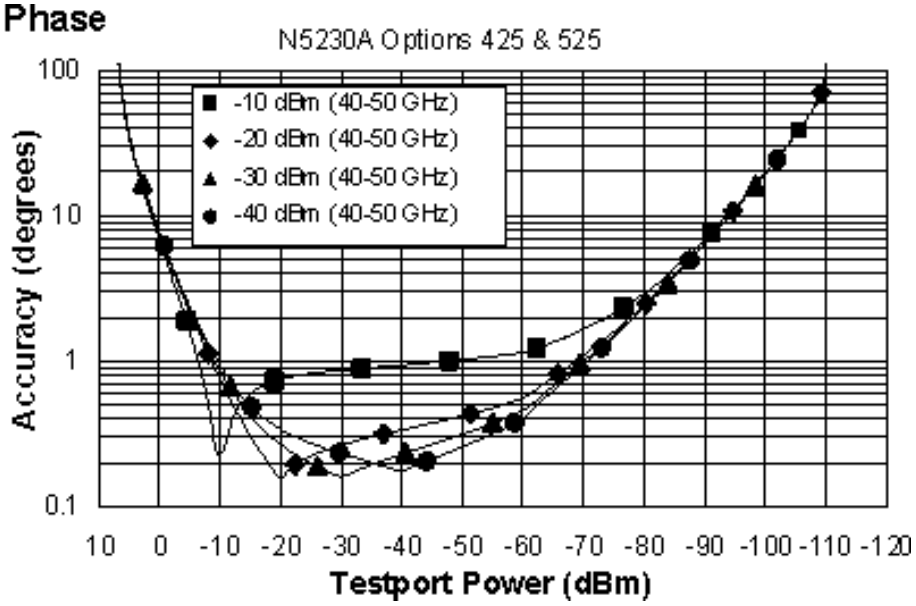
Phase



Magnitude



Phase



[a] Dynamic accuracy is verified with the following measurements:

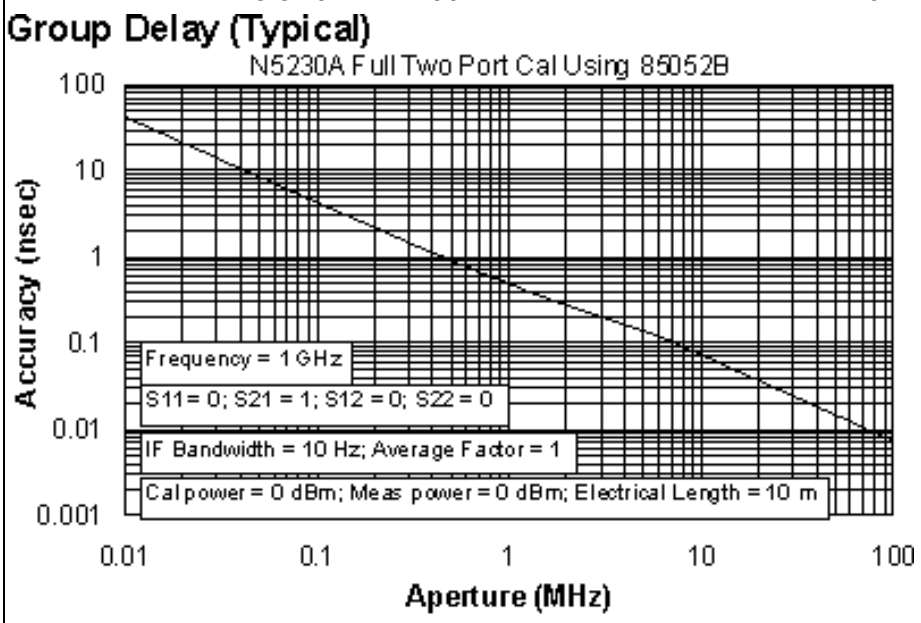
- compression over frequency
- IF linearity at a single frequency of 1.195 GHz using a reference level of -20 dBm for an input power range of 0 to -110 dBm.

Table 19. Test Port Input (Group Delay)[a]

Description	Specification	Supplemental Information (typ.)
Aperture (selectable)		(frequency span)/(number of points - 1)
Maximum Aperture		20% of frequency span
Range		0.5 x (1/minimum aperture)
Maximum Delay		Limited to measuring no more than 180° of phase change within the minimum aperture.)
Accuracy		See graph below. Char.

The following graph shows characteristic group delay accuracy with full 2-port calibration and a 10 Hz IF bandwidth. Insertion loss is assumed to be < 2 dB and electrical length to be ten meters.

NOTE: The following graph also applies to the "C" model of the analyzer.



In general, the following formula can be used to determine the accuracy, in seconds, of specific group delay measurement:

±Phase Accuracy (deg)/[360 × Aperture (Hz)]

Depending on the aperture and device length, the phase accuracy used is either incremental phase accuracy or worst case phase accuracy.

[a] Group delay is computed by measuring the phase change within a specified frequency step (determined by the frequency span and the number of points per sweep).

General Information

Table 20. Miscellaneous Information

Description	Specification	Supplemental Information
System IF Bandwidth Range		
Option 020, 025, 120, 125	--	1 Hz to 600 kHz, nominal
Option 220, 225, 420, 425, 520, 525	--	1 Hz to 250 kHz, nominal
CPU	--	Intel® 1.1 GHz Pentium® M with 1 GByte RAM

Table 21. Front Panel Information

Description	Supplemental Information
RF Connectors	
N5230A/C	
Type	Option 020, 025, 120, 125, 220 or 225: 3.5 mm (male), 50 ohm, (nominal) Option 420, 425, 520, or 525: 2.4 mm (male), 50 ohm, (nominal)
Center Pin Recession	0.002 in. (characteristic)
Display	
NOTE: The PNA display must remain in the 16 bit color setting in order to comply with international emissions regulations.	
Size	21.3 cm (8.4 in) diagonal color active matrix LCD; 640 (horizontal) X 480 (vertical) resolution
Refresh Rate	Vertical 59.83 Hz; Horizontal 31.41 kHz
Pixels	A display is considered faulty if: • A complete row or column consists of “stuck” or “dark” pixels. • More than six “stuck on” pixels (but not more than three green) or more than 0.002% of the total pixels are within the LCD specifications. • More than twelve “dark” pixels (but no more than seven of the same color) or more than 0.004% of the total pixels are within the LCD specifications. • Two or more consecutive "stuck on" pixels or three or more consecutive "dark" pixel (but no more than one set of two consecutive dark pixels) • “Stuck on” “dark” pixels are less than 6.5 mm apart (excluding consecutive pixels)
Display Range	
Magnitude	±500 dB (at 20 dB/div), max
Phase	±500°, max
Polar	10 pUnits, min 1000 Units, max
Display Resolution	
Magnitude	0.001 dB/div, min
Phase	0.01°/div, min
Marker Resolution	
Magnitude	0.001 dB, min
Phase	0.01°, min
Polar	0.01 mUnit, min; 0.01°,min

Table 22. Rear Panel Information

Description	Supplemental Information
Trigger Inputs/Outputs	BNC(f), TTL/CMOS compatible
10 MHz Reference In	
Connector	BNC, female
Input Frequency	10 MHz ± 10 ppm, Typical
Input Level	-15 dBm to +20 dBm, Typical
Input Impedance	200 Ω, nom.
10 MHz Reference Out	
Connector	BNC, female
Output Frequency	10 MHz ± 1 ppm, Typical
Signal Type	Sine Wave, Typical
Output Level	+10 dBm ± 4 dB into 50 Ω, Typical
Output Impedance	50 Ω, nominal
Harmonics	<-40 dBc, Typical
VGA Video Output	
Connector	15-pin mini D-Sub; Drives VGA compatible monitors
Devices Supported:	
	Resolutions:
Flat Panel (TFT)	1024 X 768, 800 X 600, 640 X 480
Flat Panel (DSTN)	800 X 600, 640 X 480
CRT Monitor	1280 X 1024, 1024 X 768, 800 X 600, 640 X 480
	Simultaneous operation of the internal and external displays is allowed, but with 640 X 480 resolution only. If you change resolution, you can only view the external display (internal display will "white out").
Test Set IO	
	25-pin D-Sub connector, available for external test set control
Aux IO	
	25-pin D-Sub connector, male, analog and digital IO
Handler IO	
	36-pin parallel I/O port; all input/output signals are default set to negative logic; can be reset to positive logic via GPIB command
GPIB	
	24-pin D-sub (Type D-24), female; compatible with IEEE-488.
Parallel Port (LPT1)	
	25-pin D-Sub miniature connector, female; provides connection to printers or any other parallel port peripherals
Serial Port (COM 1)	
	9-pin D-Sub, male; compatible with RS-232
USB Port	
	One port on front panel and five ports on rear panel. Universal Serial Bus jack, Type A configuration (4 contacts inline, contact 1 on left); female
Contact 1	Vcc: 4.75 to 5.25 VDC, 500 mA, maximum
Contact 2	-Data
Contact 3	+Data
Contact 4	Ground

Table 22. Rear Panel Information (Continued)	
Description	**Supplemental Information**
LAN	
	10/100BaseT Ethernet, 8-pin configuration; auto selects between the two data rates
Line Power	
Frequency, Voltage	50/60/400 Hz for 100 – 120 V 50/60 Hz for 220 – 240 V Power supply is auto switching
Max	350 watts

Note: Option H08 and Option H11 are not available with the N5230A/C

Table 23. Analyzer Dimensions and Weight

Description	**Supplemental Information**		
Cabinet Dimensions			
	Height	**Width**	**Depth**
Excluding front and rear panel hardware and feet	267 mm 10.5 in	426 mm 16.75 in	427 mm 16.8 in
As shipped - includes front panel connectors, rear panel bumpers, and feet.	280 mm 11.0 in	435 mm 17.1 in	470 mm 18.5 in
As shipped plus handles	280 mm 11.0 in	458 mm 18 in	501 mm 19.7 in
As shipped plus rack-mount flanges	280 mm 11.0 in	483 mm 19 in	470 mm 18.5 in
As shipped plus handles and rack-mount flanges	280 mm 11.0 in	483 mm 19 in	501 mm 19.70 in
Weight			
Net			
N5230A/C	24.9 kg (55 lb), nominal		
Shipping			
N5230A/C	36.3 kg (80 lb), nominal		

Note: For Regulatory and Environmental information, refer to the PNA Series Installation and Quick Start Guide, located online at http://cp.literature.agilent.com/litweb/pdf/E8356-90001.pdf.

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Measurement Throughput Summary

Table 24. Typical Cycle Time[a] (ms) for Measurement Completion

Description	Typical				
	Number of Points				
	201	401	801	1601	16,001
Start 8 GHz, Stop 18 GHz, 30 kHz IF bandwidth					
Uncorrected	97.5	102.7	103.8	108.2	683.9
2-Port cal	203.7	213.5	218.5	234.6	1504.3
Start 10 MHz, Stop 10 GHz, 30 kHz IF bandwidth					
Uncorrected	112.6	120.6	124.8	138.2	738.4
2-Port cal	232.8	251.8	265.2	304.3	1623.4
Start 10 MHz, Stop 20 GHz, 30 kHz IF bandwidth					
Uncorrected	146	199.3	210.9	217.2	753.9
2-Port cal	302.3	410.5	438.7	462.5	1660.5
Start 8 GHz, Stop 18 GHz, 50 kHz IF bandwidth					
Uncorrected	79.1	81	81.7	86.6	482
2-Port cal	164.5	170.3	175.3	193.5	1104.7
Start 10 MHz, Stop 10 GHz, 50 kHz IF bandwidth					
Uncorrected	96.8	101.7	108.8	122.2	524.6
2-Port cal	202.1	215.6	236.7	276.7	1198.8
Start 10 MHz, Stop 20 GHz, 50 kHz IF bandwidth					
Uncorrected	141.6	163.9	170.7	179.7	546.5
2-Port cal	293.6	341	360	389.5	1248.8

[a] Includes sweep time, retrace time and band-crossing time. Analyzer display turned off with DISPLAY:ENABLE OFF. Add 21 ms for display on. Data for one trace (S_{11}) measurement.

Table 25. *(Options 020/025, 120/125, only)* Cycle Time vs IF Bandwidth

Applies to the Preset condition (201 points, correction off) except for the following changes:

- CF = 10 GHz
- Span = 100 MHz
- Display off (add 21 ms for display on)

Description	Typical Performance	
IF Bandwidth (Hz)	Cycle Time (ms)[a]	Trace Noise (dB rms)
600,000	7	0.0035
360,000	7	0.0026
280,000	7	0.0022
200,000	7	0.0021
150,000	7	0.0016
100,000	7	0.0012
70,000	7	0.0011
50,000	9	0.0009
30,000	11	0.0008
20,000	14	0.0006
15,000	17	0.0005
10,000	28	0.0004
7000	37	0.0004
5000	48	0.0003
3000	72	0.0003
2000	102	0.0002
1500	130	0.0001
1000	218	0.0001
700	294	0.0001
500	399	0.0001
300	636	0.0001
200	932	0
100	1826	0
30	6004	0
10	17903	0
1	178398	0

[a] Cycle time includes sweep and retrace time.

Table 26. *(Options 220/225, 420/425, 520/525 only)* Cycle Time vs IF Bandwidth

Applies to the Preset condition (201 points, correction off) except for the following changes:

- CF = 10 GHz
- Span = 100 MHz
- Display off (add 21 ms for display on)

Description	Typical	
IF Bandwidth (Hz)	Cycle Time (ms)[a]	Cycle Time (ms) Option 080 enabled
250,000	8.9	37.9
200,000	9.3	39.3
150,000	9.9	40.1
100,000	10.5	41.8
70,000	11.5	43.6
50,000	12.8	45.4
30,000	15.4	50
20,000	18.3	53.9
15,000	21	57.5
10,000	27	65.8
7000	34	75.4
5000	48.5	93
3000	72.8	124
2000	108.8	169
1500	126.8	187.1
1000	272.5	
700	357.7	
500	460	
300	697.7	
200	1003.5	
150	1307.8	
100	1917.6	
30	6173.8	
10	18214.8	
1	181699.2	

[a] Cycle time includes sweep and retrace time.

Table 27. *(Options 020/025, 120/125, only)* Cycle Time vs Number of Points

Applies to the Preset condition (correction off) except for the following changes:

- CF = 10 GHz
- Span = 100 MHz
- Display off (add 21 ms for display on)

Description	Typical Performance	
IF Bandwidth (Hz)	Number of Points	Cycle Time (ms)[a]
30,000	3	6.7
	11	7.4
	51	6.9
	101	7.8
	201	11.2
	401	18.3
	801	32.4
	1,601	59.4
	6,401	224.7
	16,001	556.9
100,000	3	6.7
	11	6.6
	51	6.8
	101	7
	201	7.5
	401	9
	801	13.5
	1,601	22.9
	6,401	75.3
	16,001	180.3
600,000	3	6.5
	11	6.6
	51	6.8
	101	6.9
	201	7.3
	401	8.1
	801	9.4
	1,601	12
	6,401	27.7
	16,001	59.3

[a] Cycle time includes sweep and retrace time.

Table 28. *(Options 220/225, 420/425, 520/525 only)* Cycle Time vs Number of Points

Applies to the Preset condition (correction off) except for the following changes:

- CF = 10 GHz
- Span = 100 MHz
- Display off (add 21 ms for display on)

Description	Typical	
IF Bandwidth (Hz)	Number of Points	Cycle Time (ms)[a]
30,000	3	8
	11	8
	51	9.38
	101	11.4
	201	15.5
	401	23.6
	801	39.9
	1,601	71.6
	6,401	265.4
	16,001	650.8
50,000	3	7.7
	11	7.7
	51	8.7
	101	10.1
	201	13
	401	18.6
	801	29.8
	1,601	52.3
	6,401	184.5
	16,001	448.8
250,000	101	8.7
	201	9.05
	401	10.85
	801	14.42
	1,601	21.63
	6,401	61.1
	16,001	147.7

[a] Cycle time includes sweep and retrace time.

Table 29. Data Transfer Time (ms)

Description	Typical			
	Number of Points			
	201	401	1601	16,001
SCPI over GPIB (program executed on external PC)				
32-bit floating point	7	12	43	435
64-bit floating point	12	22	84	856
ASCII	64	124	489	5054
SCPI (program executed in the analyzer)				
32-bit floating point	1	2	3	30
64-bit floating point	2	2	4	40
ASCII	29	56	222	2220
COM (program executed in the analyzer)				
32-bit floating point	<0.4	0.4	0.5	1.9
Variant type	0.7	1	3	32
DCOM over LAN (program executed on external PC)				
32-bit floating point	<0.8	1	1.5	7.1
Variant type	1.8	2.7	8.5	80

Note: Specifications for Recall & Sweep Speed are not provided for the N5230A/C analyzers.

Specifications: Front-Panel Jumpers

Model N5230A/C Options 025, 125, 225, 425, and 525

NOTE: The N5230A/C Options 020, 120, 220, 420, and 520 (Standard Test Set and Standard Power Range) have no front-panel jumpers.

Table 30: Measurement Receiver Inputs (Rcvr A In, Rcvr B In) 0.1dB Typical Compression

Description	Specification	Typical		
		Option 025, 125	Option 225	Options 425, 525
Maximum Input Level				
300 kHz to 10 MHz	--	-11 dBm	--	--
10 MHz to 45 MHz	--	-7 dBm	- 2 dBm	- 20 dBm
45 MHz to 500 MHz	--	-7 dBm	- 2 dBm	- 19 dBm
500 MHz to 2 GHz	--	-6 dBm	- 3 dBm	- 14 dBm
2 GHz to 12.5 GHz	--	-6 dBm	- 6 dBm	- 14 dBm
12.5 GHz to 13.5 GHz	--	-7 dBm	- 6 dBm	- 15 dBm
13.5 GHz to 20 GHz	--	--	- 6 dBm	- 15 dBm
20 GHZ to 31.25 GHz	--	--	--	- 16 dBm
31.25 GHZ to 40 GHz	--	--	--	- 21 dBm
40 GHZ to 45 GHz	--	--	--	- 24 dBm
45 GHZ to 50 GHz	--	--	--	- 22 dBm
Damage Level				
N5230A/C	--	+ 15 dBm		
Maximum DC Level				
N5230A/C	--	+/- 16 V	+/- 7 V	

Table 31: Reference Receiver Inputs (Rcvr R1, Rcvr R2) @ Max Specified Output Power

Description	Specification	Typical		
		Option 025, 125	Option 225	Options 425, 525
Maximum Input Level				
300 kHz to 10 MHz	--	-15 dBm	--	--
10 MHz to 500 MHz	--	-13 dBm	- 18 dBm	- 28 dBm
500 MHz to 2 GHz	--	-14 dBm	- 18 dBm	- 28 dBm
2 GHz to 6 GHz	--	-14 dBm	- 19 dBm	- 28 dBm
6 GHz to 8 GHz	--	-16 dBm	- 19 dBm	- 28 dBm
8 GHz to 9 GHz	--	-16 dBm	- 21 dBm	- 27 dBm
9 GHz to 10.5 GHz	--	-20 dBm	- 21 dBm	- 27 dBm
10.5 GHz to 12.5 GHz	--	-22 dBm	- 21 dBm	- 27 dBm
12.5 GHz to 13.5 GHz	--	-24 dBm	- 23 dBm	- 26 dBm
13.5 GHz to 20 GHz	--	--	- 23 dBm	- 26 dBm
20 GHZ to 31.25 GHz	--	--	--	- 33 dBm
31.25 GHZ to 40 GHz	--	--	--	- 27 dBm
40 GHZ to 45 GHz	--	--	--	- 29 dBm
45 GHZ to 50 GHz	--	--	--	- 28 dBm
Damage Level				
N5230A/C	--	+ 15 dBm		
Maximum DC Level				
N5230A/C	--	+/- 16 V	+/- 7 V	

Table 32: Reference Outputs (Reference 1 Source Out, Reference 2 Source Out) @ Max Specified Output Power

Description	Specification	Typical		
		Option 025, 125	Option 225	Options 425, 525
Maximum Input Level				
300 kHz to 10 MHz	--	-15 dBm	--	--
10 MHz to 500 MHz	--	-13 dBm	- 18 dBm	- 28 dBm
500 MHz to 2 GHz	--	-14 dBm	- 18 dBm	- 28 dBm
2 GHz to 6 GHz	--	-14 dBm	- 19 dBm	- 28 dBm
6 GHz to 8 GHz	--	-16 dBm	- 19 dBm	- 28 dBm
8 GHz to 9 GHz	--	-16 dBm	- 20 dBm	- 27 dBm
9 GHz to 10.5 GHz	--	-20 dBm	- 20 dBm	- 27 dBm
10.5 GHz to 12.5 GHz	--	-22 dBm	- 20 dBm	- 27 dBm
12.5 GHz to 13.5 GHz	--	-24 dBm	- 23 dBm	- 26 dBm
13.5 GHz to 20 GHz	--	--	- 23 dBm	- 26 dBm
20 GHZ to 31.25 GHz	--	--	--	- 32 dBm
31.25 GHZ to 40 GHz	--	--	--	- 26 dBm
40 GHZ to 45 GHz	--	--	--	- 29 dBm
45 GHZ to 50 GHz	--	--	--	- 28 dBm
Damage Level				
N5230A/C	--	+ 20 dBm		
Maximum DC Level				
N5230A/C	--	+/- 16 V	+/- 7 V	

Table 33: Source Outputs (Port 1 Source Out, Port 2 Source Out) @ Max Specified Output Power

Description	Specification	Typical		
		Option 025, 125	Option 225	Options 425, 525
Maximum Input Level				
300 kHz to 10 MHz	--	+11 dBm	--	--
10 MHz to 500 MHz	--	+11 dBm	+ 6 dBm	+1 dBm
500 MHz to 6 GHz	--	+11 dBm	+7 dBm	+1 dBm
6 GHz to 9 GHz	--	+10 dBm	+7 dBm	+1 dBm
9 GHz to 12.5 GHz	--	+8 dBm	+7 dBm	+1 dBm
12.5 GHz to 13.5 GHz	--	+5 dBm	+5 dBm	+3 dBm
13.5 GHz to 20 GHz	--	--	+5 dBm	+3 dBm
20 GHZ to 31.25 GHz	--	--	--	-5 dBm
31.25 GHZ to 40 GHz	--	--	--	-4 dBm
40 GHZ to 45 GHz	--	--	--	- 11 dBm
45 GHZ to 50 GHz	--	--	--	- 11 dBm
Damage Level				
N5230A/C	--	+ 27 dBm	+ 30 dBm	
Maximum DC Level				
N5230A/C	--	+/- 16 V	+/- 7 V	

Table 34: Coupler Inputs (Port 1 Cplr Thru, Port 2 Cplr Thru) Insertion Loss of Coupler Thru

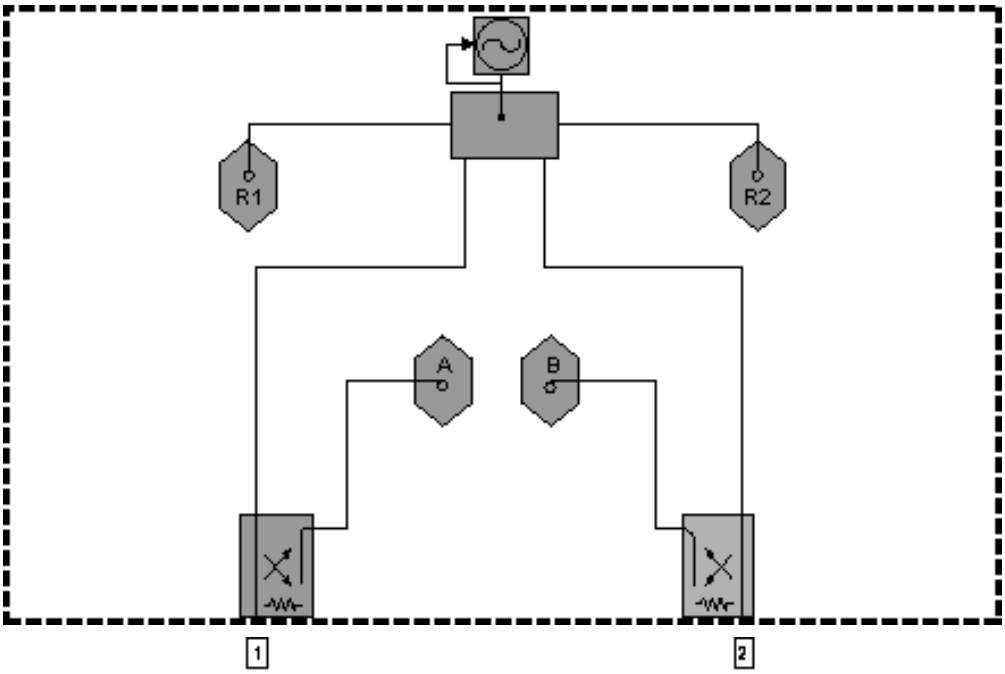
Description	Specification	Typical		
		Option 025, 125	Option 225	Options 425, 525
Maximum Input Level				
300 kHz to 10 MHz	--	2 dB	--	--
10 MHz to 500 MHz	--	2 dB	0.6 dB	0.6 dB
500 MHz to 2 GHz	--	3 dB	1.6 dB	0.8 dB
2 GHz to 8 GHz	--	3 dB	1.8 dB	1 dB
8 GHz to 9 GHz	--	3 dB	1.9 dB	1 dB
9 GHz to 12.5 GHz	--	4 dB	1.9 dB	1 dB
12.5 GHz to 13.5 GHz	--	4 dB	2.0 dB	2 dB
13.5 GHz to 20 GHz	--	--	2.0 dB	2 dB
20 GHZ to 31.25 GHz	--	--	--	3 dB
31.25 GHZ to 50 GHz	--	--	--	4 dB
Damage Level				
N5230A/C	--	+ 27 dBm	+ 30 dBm	
Maximum DC Level				
N5230A/C	--	+/- 16 V	+/- 40 V	

Table 35: Coupler Outputs (Port 1 Cplr Arm, Port 2 Cplr Arm)

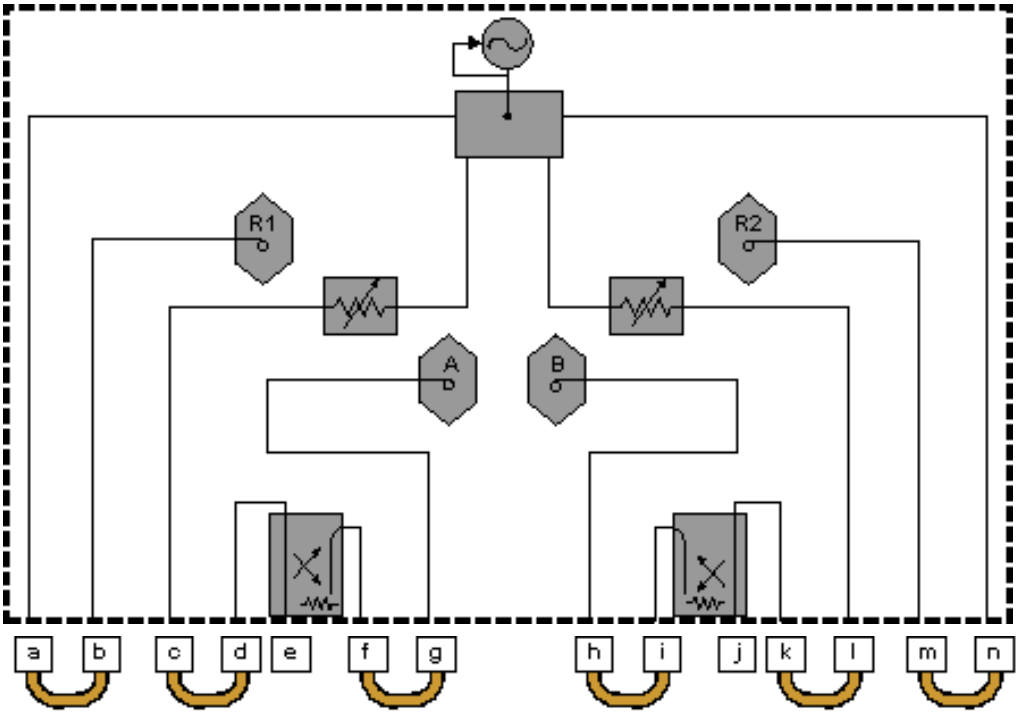
Description	Specification	Typical		
		Option 025, 125	Option 225	Option 425, 525
Damage Level				
N5230A/C	--	+ 15 dBm	+ 30 dBm	
Maximum DC Level				
N5230A/C	--	0 V	+/- 7 V	

Test Set Block Diagrams

N5230A/C Option020, or 120, or 220, or 420, or 520 (Standard Test Set and Standard Power Range)



N5230A/C Option025, or 125, or 225, or 425, or 525 (Configurable Test Set and Extended Power Range)



Item	Description	Item	Description
a	SOURCE OUT	**h**	RCVR B IN
b	RCVR R1 IN	**i**	CPLR ARM
c	SOURCE OUT	**j**	PORT 2
d	CPLR THRU	**k**	CPLR THRU
e	PORT 1	**l**	SOURCE OUT
f	CPLR ARM	**m**	RCVR R2 IN
g	RCVR A IN	**n**	SOURCE OUT